

DRAFT Report

(95% Review)

Range Roads 231, 232 and 233

Functional Planning Report

Range Roads 231, 232 and 233
Draft Functional Planning Report
(95% Review)

Prepared for:

Starthcona County

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Project No. 57257

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EXECUTIVE SUMMARY

E.1 BACKGROUND AND OBJECTIVE

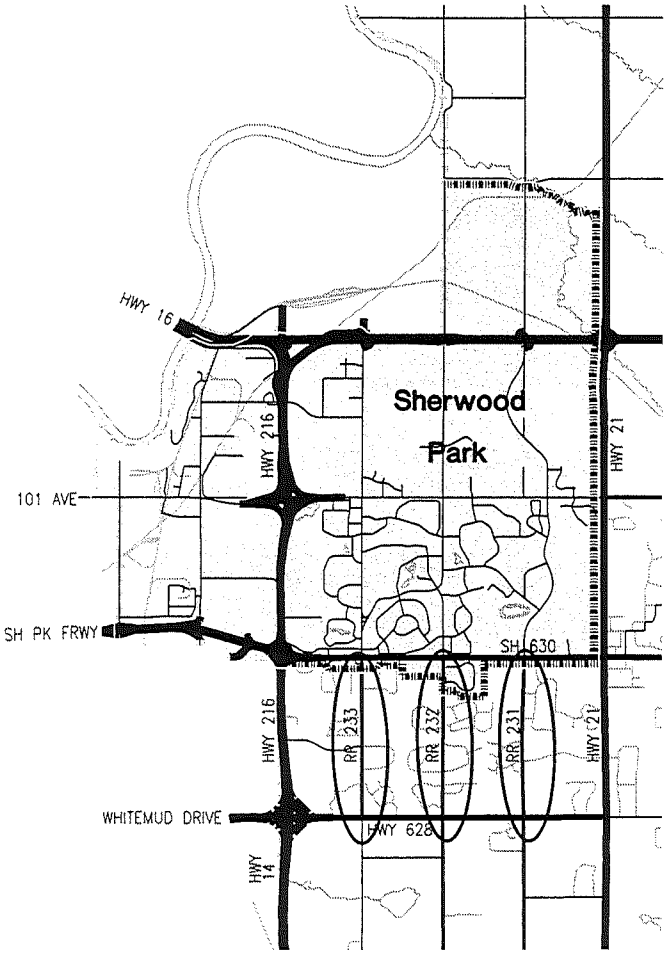
Earth Tech (Canada) Inc. was retained by Strathcona County to conduct a functional planning study of Range Roads 231, 232, & 233, from Highway 628 to Wye Road. Exhibit E.1 shows the study area. This report outlines the functional planning study and identifies the recommended plans based on established objectives.

The following objectives were established for this study:

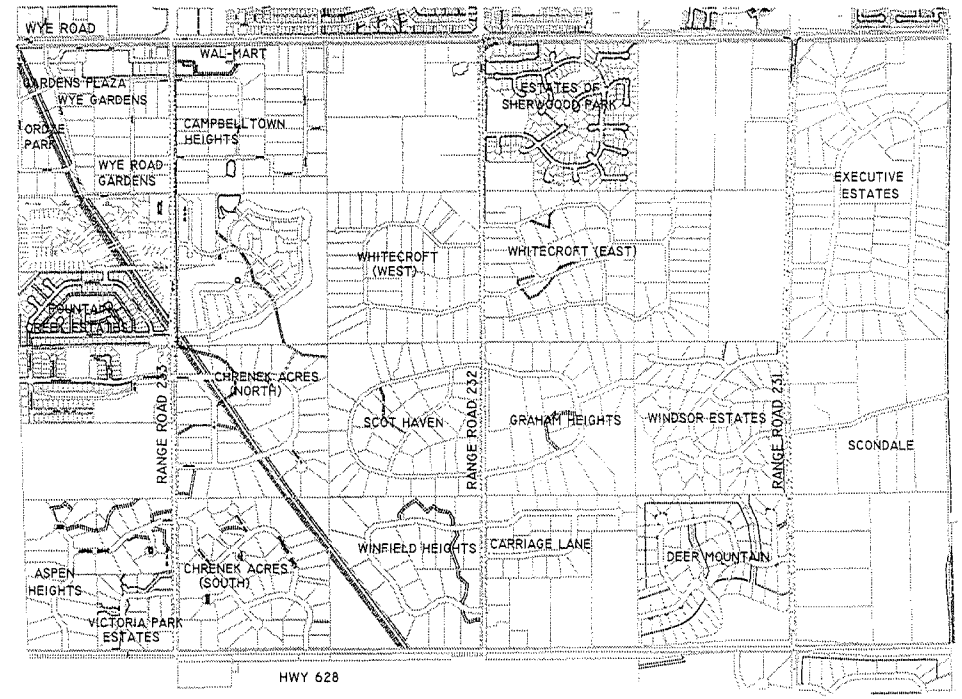
- Identify roadway upgrading needed to rectify existing deficiencies, to accommodate future growth, and to manage access.
- Ensure compatibility with Highway 628.
- Identify a recommended cross-section, urban or rural, for each of the roadways under consideration
- Identify stormwater management requirements for each of the roadway corridors.
- Identify how pedestrians and other trail users will be accommodated along the upgraded roadways.
- Identify noise attenuation requirements for each of the upgraded roadways.
- Identify right of way requirements to accommodate the recommended roadway cross-sections with all related elements such as drainage, utilities, pedestrian facilities and noise attenuation facilities.
- Identify an implementation strategy based on the priority of the recommended improvements.

E.2 EXISTING AND FUTURE TRANSPORTATION NETWORK

Range Roads 231, 232 and 233 connect Wye Road in Sherwood Park at the north end of the study and Highway 628 at the south study limit. All three range roads have an exisitng 9 metre paved cross section with two 3.5m lanes and 1 metre wide shoulders. The posted speed limit on all three Range Roads is 80 km/hr.



STRATHCONA COUNTY
KEY PLAN
N.T.S.



KEY PLAN
N.T.S.

EXHIBIT E.1

RANGE ROAD 231,232, & 233
STUDY AREA

PROJECT SITE PLAN
RANGE ROADS 233, 232 and 231
KEY PLAN

Strathcona County

EARTH TECH	SCALE N.T.S.	DRAWN BY W.L.
	FILE 57257	DATE DECEMBER 2002

L:\work\57000\57257\02a-CAD\TRA\Report\Exhibits\Exhibit E.1.dwg, 03/04/2004 08:44:55 AM, 1:73.563

There are five at grade intersections on Range Road 231, ten on Range Road 232 and nine on Range Road 233. These intersections typically consist of subdivision entrances intersecting with the range roads. In addition there are number of individual driveway access points to individual residential acreages and other uses.

The most significant change in the roadway network affecting the study area is the future twinning of Highway 628 by Alberta Transportation at the south end of the study area. In conjunction with the twinning, Alberta Transportation is contemplating the closure of several existing accesses to residential subdivisions north of Highway 628 and rerouting subdivision access to the range roads, which are the subject of a separate study. The rerouting of access from Highway 628 onto the range roads will result in an additional intersection.

E.3 EXISTING AND FUTURE TRAFFIC VOLUMES

The following table shows the existing and future projected traffic volumes along Range Roads 231, 232 and 233.

Table E1 – Existing and Future Projected Annual Average Daily Traffic

Location	2001 Existing AADT	2016 Projected AADT
Range Road 233		
Wye Road to Ordze Avenue	18,900	23,500
Ordze Avenue to Fountain Creek Road	6,400	9,700
Fountain Creek Road to Township Road 523	5,300	8,000
Township Road 523 to Highway 628	4,800	7,200
Range Road 232		
Wye Road to Estate Drive	7,900	19,400
Estate Drive to Edward Crescent (North)	4,100	6,200
Edward Crescent (North) to Highway 628	3,700	5,600
Range Road 231		
Wye Road to Thomson Road	7,100	11,200
Thomson Road to Sconadale Road/Windsor Drive	3,600	7,400
Sconadale Road/Windsor Drive to Highway 628	3,300	6,800

E.4 DEVELOPMENT OF ALTERNATIVES

Using the results of the traffic analysis and existing safety issues and public inputs, several conceptual single-line transportation network alternatives were developed to illustrate existing and future transportation and development plans.

E.5 ENVIRONMENTAL CONCERNS / MITIGATION

The roadway upgrading project results in the loss of soil quality, quantity and land capability, loss of natural vegetation/wetlands, loss/alteration of wildlife habitat, wildlife mortality, disruption of wildlife movements, sensory disturbance to wildlife, and disturbance to historical resources. Recommended mitigation measures include implementation of soil handling guidelines, minimizing loss of natural habitat, compensation for lost habitat, appropriate scheduling of construction periods, and monitoring of wildlife/vehicle collisions. In addition, a rare plant and wildlife survey within natural habitats, and archaeological inspections are recommended along any finalized alignments prior to construction.

E.6 PUBLIC CONSULTATION

A total of three open houses were organized to form a link between local residents/landowners, and the project team, for the purpose of sharing project concerns, determining ways to address those concerns. In the first open house a preliminary improvement strategies were presented which included; intersection improvements, access management, speed management and road way widening options.

Some of the concerns or requests raised by the public during these open houses were:

- Lowering the speed limit;
- Construction of trail for pedestrian;
- Intersection improvements;
- Access Management;
- Increased noise from the traffic.

These comments were taken into consideration and presented in the second open house, which covered preliminary proposal on intersection improvements, access changes,

posted, and operating speeds and pedestrian circulation. The recommended plans were displayed at a third Open House that covered the roadway twinning, intersection improvements, Access Changes, Posted Speeds, Pedestrian Circulation and Right of Way Requirement.

The majority of the people who provided in comments to the open house information agreed with:

- Lowering the speed limit to 70km/hr;
- Intersection improvement;
- Construction of asphalt trail.

E.7 RECOMMENDED PLAN

Based on the feedback received from the Public Open Houses and technical considerations, the project team in consultation with Strathcona County has created a "Recommended Plan." The recommended plans for all three Range Roads are presented in Exhibits E.2, E.3 and E.4 in a single sheet and complete drawing set is presented in Appendix H. Key elements of the Recommended Plan are:

- **Roadway Twinning**

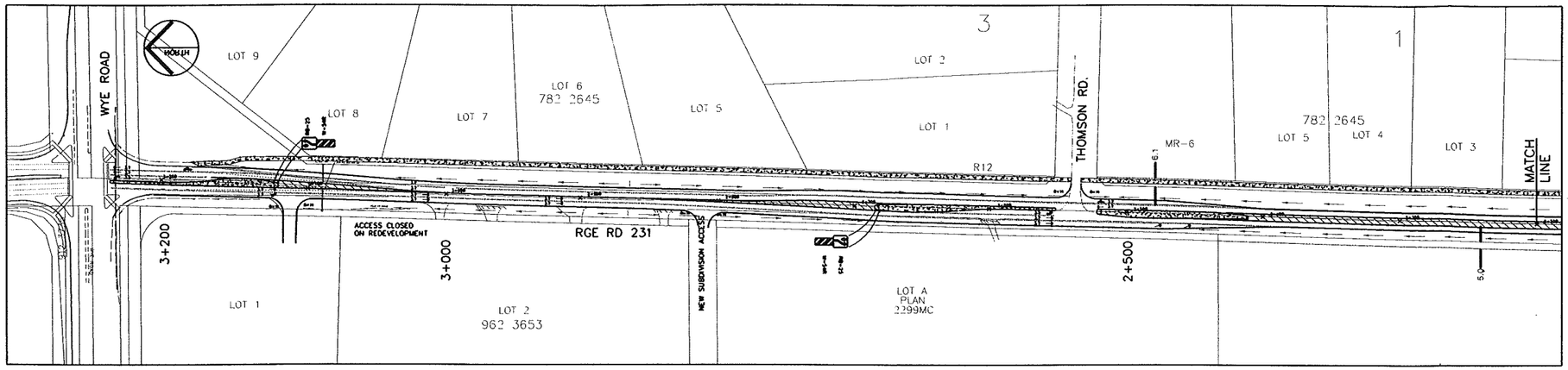
  Based on the future traffic volume and threshold level of service "C", development of a 4 lane divided road is required from Wye Road to Thomson Road (Range Road 231), Wye Road to Estate Drive (Range Road 232) and Ordze Avenue to Fountain Creeek Road (Range Road 233). The extent of twinning is shown in Appendix H.

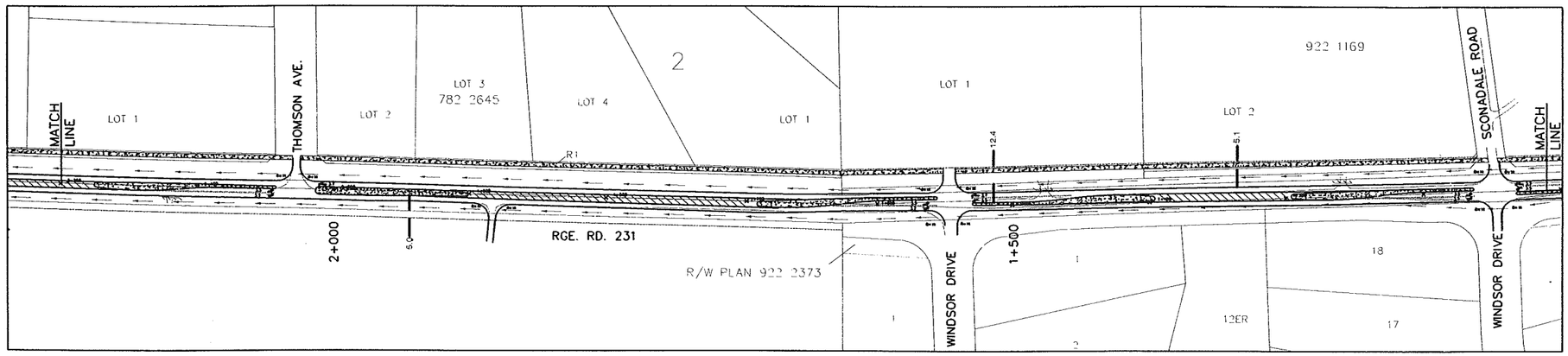
- **Intersection Improvements - General**

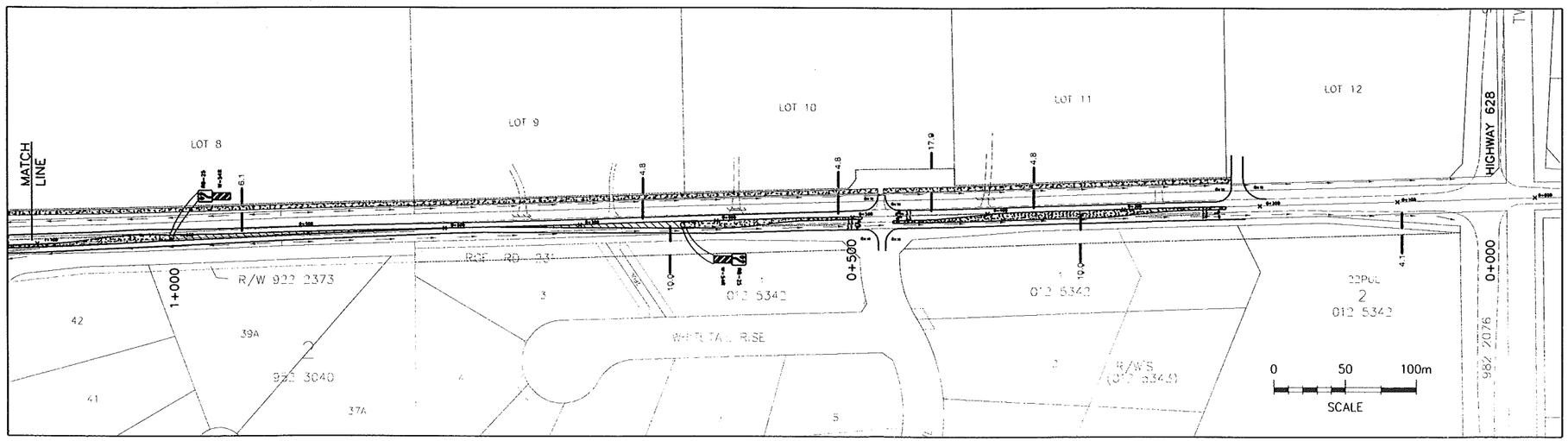
  In order to improve traffic flow and safety along the three range roads, it is recommended that left turn lanes with a raised median be implemented at all existing and future subdivision entrances and other major access points.

- **Access Changes**

  To improve traffic flow and safety on the range road, a number of access modifications are being recommended. These modifications are intended to reduce the number of accesses from individual properties and/or to re-arrange accesses to better locations.







LEGEND

PROFILE

- EXISTING GROUND CL
- ASBUILT EAST DITCH
- ASBUILT WEST DITCH
- ASBUILT CENTERLINE

PLAN

- PROPERTY LINE
- FENCE
- NUL/GAS LINE
- TAU/POWER LINE
- AGT/TELEPHONE LINE
- EXISTING RIGHT DITCH
- EXISTING LEFT DITCH
- BACKSLOPE LIMITS
- HORIZONTAL BASELINE
- ORIG. TOPO FEATURES ie. ROAD , BLDG.
- TREE
- BUSH
- SLOUGH/WATER
- DIRECTION OF FLOW
- CULVERT
- PROPOSED PROPERTY LINE
- PROPOSED SIDEWALK

NOTES:

1. MINIMUM PRIVATE APPROACH RADIUS 6.0m, MINIMUM ROADWAY INTERSECTION OR COMMERCIAL RADIUS 12.0m UNLESS OTHERWISE SPECIFIED.
2. ALL UTILITIES SHOWN ARE REPRESENTATIVE ONLY AND MUST BE LOCATED IN FIELD BY THE PROPER AUTHORITIES PRIOR TO CONSTRUCTION COMMENCEMENT.
3. ALL REPLACEMENT CULVERTS TO BE CMP, MIN 450ø FOR PRIVATE APPROACHES, 600ø FOR THROUGH GRADES UNLESS OTHERWISE NOTED. ALL CULVERTS TO BE LOCATED AT END OF RADIUS TO MINIMIZE REQUIRED LENGTH OF CULVERT.
4. MINIMUM WIDTH 6.5m FOR PRIVATE APPROACHES OR TAPERED TO MATCH EXISTING.
5. USE OF MUNICIPAL RESERVE LANDS MUST BE APPROVED BY STRATHCONA COUNTY COMMUNITY & ENVIRONMENTAL PLANNING, 464-8117.
6. ALL TRAFFIC CONTROL SIGNS TO BE REPLACED UPON COMPLETION OF THE ROAD RECONSTRUCTION PRIOR TO REOPENING THE ROAD TO THE PUBLIC.

No.	DATE	BY	ENG	SUBJECT

REVISIONS

Strathcona County
ENGINEERING & ENVIRONMENTAL PLANNING
2001 SHERWOOD DRIVE
SHERWOOD PARK, ALBERTA, T8A 3W7

JOB NUMBER	---
SURVEY, DATE & BOOK	
DRAWN	---
DESIGNED	---
CHECKED	---
APPROVED	---
APPROVED	---

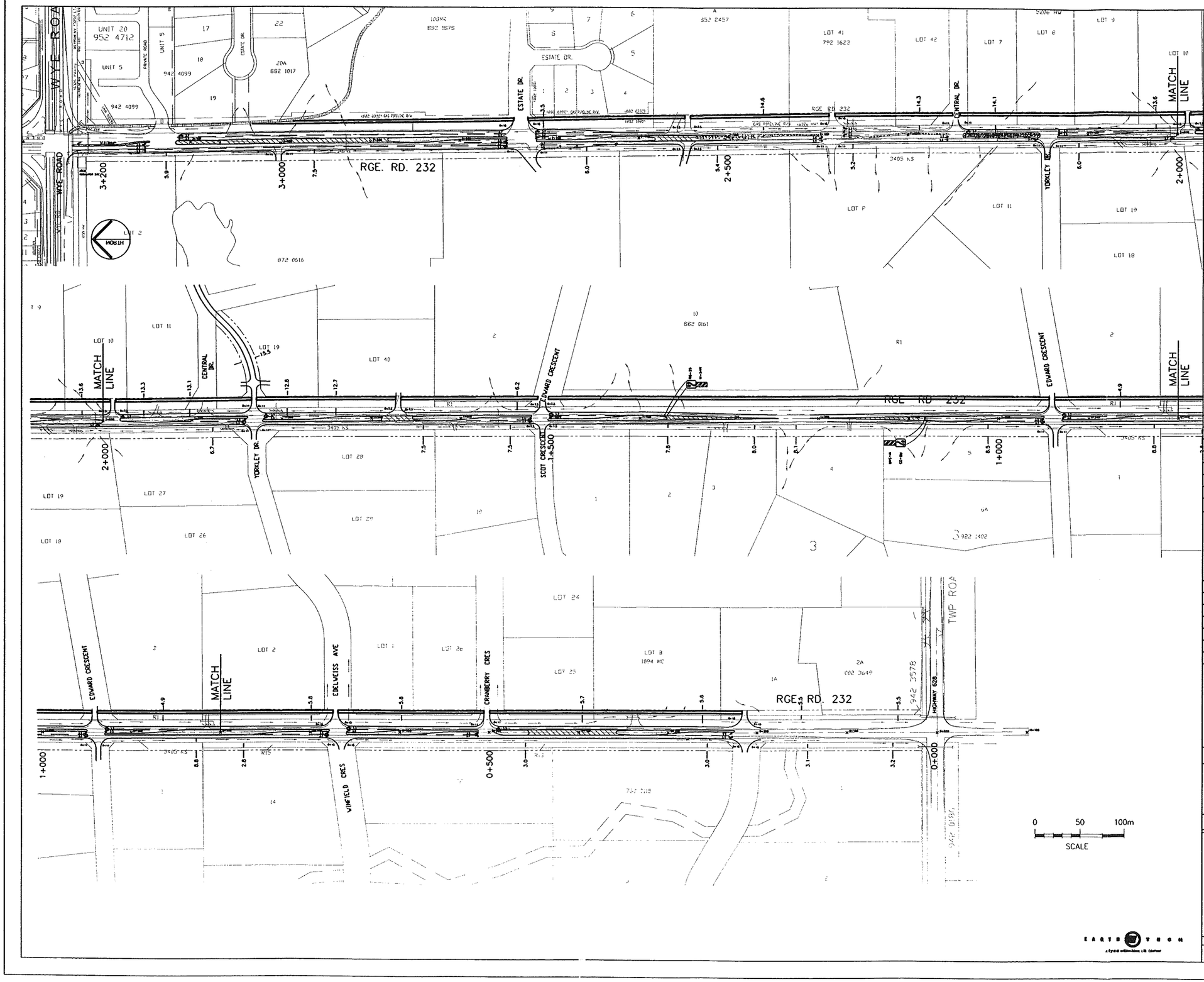
ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

DATE 2003/MAY/00	PERMIT
SCALE 1: 3000	
DRAWN by APL	

RANGE ROAD 231 FROM WYE ROAD TO TWP. RD. 522

RECOMMENDED PLAN

DRAWING NUMBER	REV.	SHEET
EXHIBIT E.2	A	1



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APPROVED	---
APPROVED	---

ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

DATE 2003/MM/DD
SCALE
DRAWN by APL

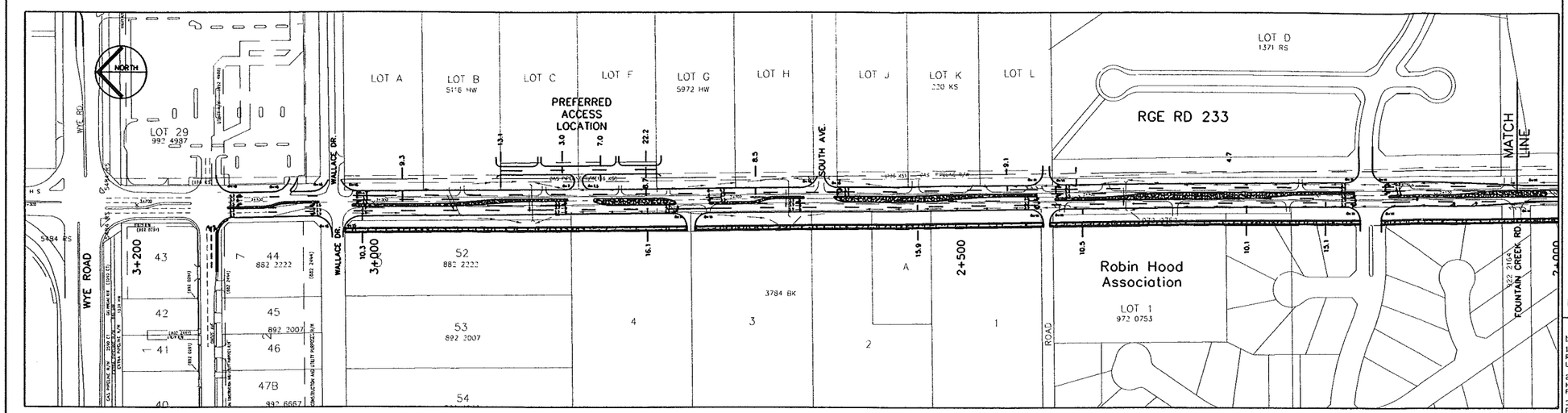
PERMIT

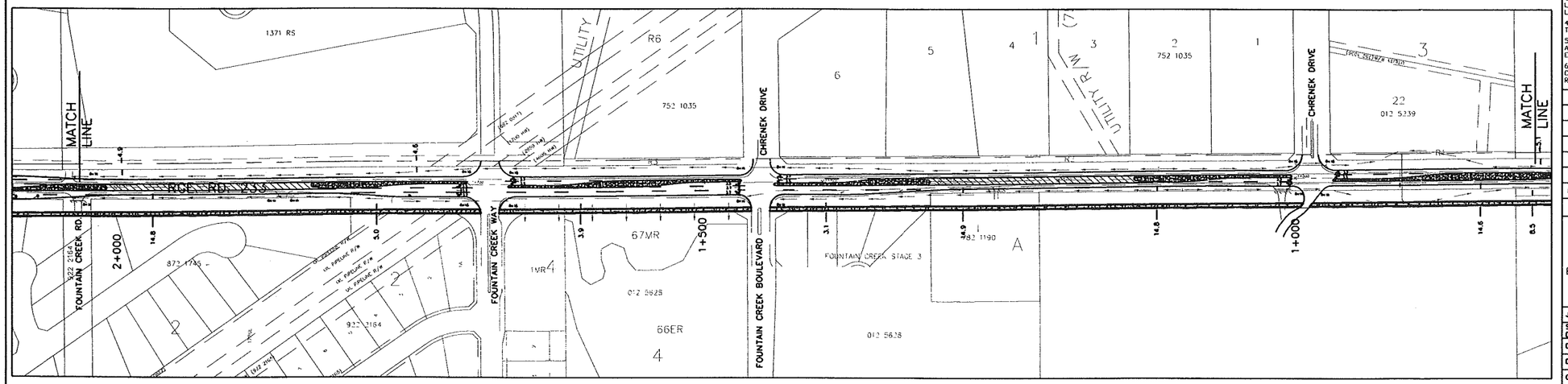
RANGE ROAD 232 FROM WYE ROAD TO TWP. RD. 522

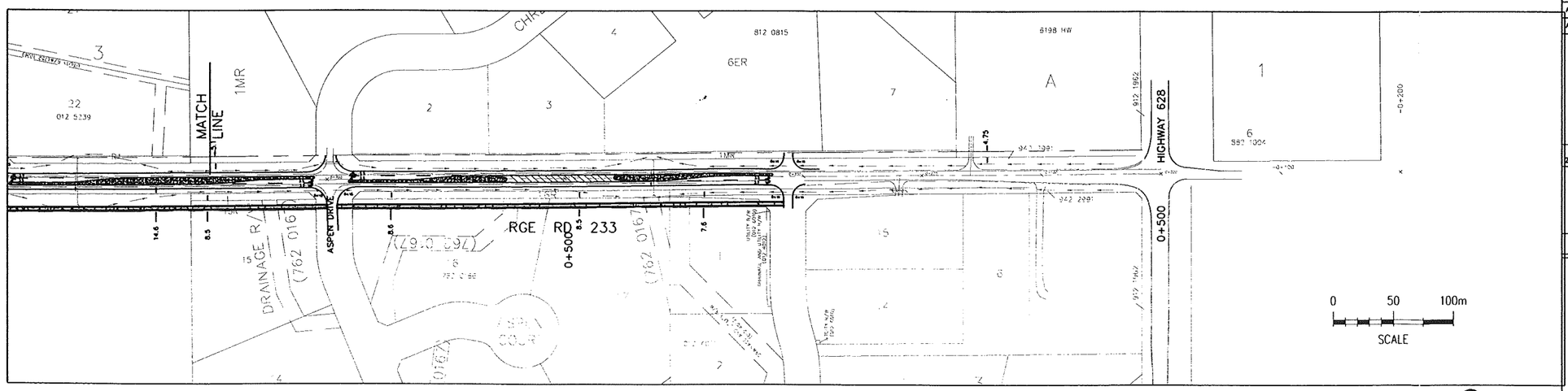
RECOMMENDED PLAN

DRAWING NUMBER	REV.	SHEET
EXHIBIT E.	A	1

EARTHTECH
A Tyco International LTD Company







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ENGINEERING & ENVIRONMENTAL PLANNING
2001 SHERWOOD DRIVE
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JOB NUMBER	---
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APPROVED	---
APPROVED	---

ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

DATE 2003/MM/DD	PERMIT
SCALE	
DRAWN by APL	

RANGE ROAD 233 FROM WYE ROAD TO TWP. RD. 522

RECOMMENDED PLAN

DRAWING NUMBER	REV	SHEET
EHIBIT E.4	A	1

- **Intersection Improvements near Wal-Mart**

  In order to address traffic problems on Range Road 233 at Ordze Avenue, the following changes are recommended:

  - Localized widening of Ordze Avenue immediately west of Range Road to create two eastbound lanes approaching Range Road 233.
  - Installation of a traffic signal at Range Road 233 and Ordze Avenue to facilitate movement onto and across Range Road 233.
  - Creation of a left turn lane from Wye Road into the Wal-Mart site

  This work (localized widening and signal installation) was completed in 2003.

- **Posted Speeds**

  Based on feedback from residents and road users and through speed surveys conducted by Strathcona County, the existing 80 km/hr speed limit on the three range roads is recommended to be reduced to 70 km/hr.

- **Right of Way Requirements**

  To address existing traffic concerns, and to accommodate possible future growth, it is recommended that a minimum right of way of 40m be reserved for each of the range roads for upgrading to a Class I road standard, and an additional 5m right of way be reserved for a multi-use trail, for a total right of way width of 45m. This is in keeping with Strathcona County's current standards.

- **Pedestrian Circulation**

  A 3.0m wide trail is to be developed along east side of the Range Road. In order to accommodate such a trail, it will be necessary to acquire land from adjacent property owners.

- **Traffic Noise Calculations**

  The results of sound level calculation project that the future noise levels along the road will vary from 51.4 to 56.5 dBA in Range Road 231, between 54.4 dBA to 61.3 dBA in Range Road 232 and 53.6 dBA to 59.8 dBA in Range Road 233. These values are lower than the threshold noise level of 65dBA, hence, retrofit noise attenuation is not required during the period of 2001 and 2016.

- **Intersection Illumination**

  Analysis based on present traffic volume indicates that, partial or delineation lightings are warranted at Deer Mountain Intersection on Range Road 231, at Estate Drive on Range Road 232 and at Walmart/Ordze Road, Fountain Creek Road, Fountain Creek Way and Fountain Creek Boulevard on Range Road 233.

- **Storm Water Drainage**

  The analysis of changes to the volumes in storm water flow resulting from the intersection treatments indicates there will be negligible increase in the flow. Current ditch drainage will have to be maintained by the realignment of the ditches where the road is widened and installation of new culverts to convey flows under the affected roadways. In the area on Range Road 233 where the existing two lane rural roadway is upgraded to a four lane divided urban section, a new piped storm sewer will have to be installed. A review of the existing storm lines and dry pond will be required to confirm capacities or identify improvements.

E.8 COST ESTIMATE

Table E.2 shows the estimated cost for upgrading Range Roads. Estimate is divided into Multi-Use Trail, Intersection Treatment, Urban Roadway and Rural Roadway. Detailed cost estimate breakdown is presented in Appendix J.

Table E.2 Summary of Cost Estimate

Item	Range Road 231	Range Road 232	Range Road 233	TOTAL
Multi-Use Trail	$ 118,000	$ 114,000	$ 114,000	$ 346,000
Intersection treatment	$ 114,000	$ 285,000	$ 545,000	$ 944,000
Urban Roadway	$ 1,284,000	$ 920,000	$ 1,589,000	$ 3,793,000
Rural Roadway	$ 1,760,000	$ 2,984,000	$ 2,240,000	$ 6,984,000
Total Estimated Cost (Rounded)	**$ 3,276,000**	**$ 4,303,000**	**$ 4,488,000**	**$ 12,067,000**

E.9 IMPLEMENTATION STARTEGY

Table E.3 shows the implementation strategy.

Table E.3 - Tentative Implementation Schedule

Tasks	Range Road 233			Range Road 232			Range Road 231		
	1-5 yrs.	6-10 yrs.	10-15 yrs.	1-5 yrs.	6-10 yrs.	10-15 yrs.	1-5 yrs.	6-10 yrs.	10-15 yrs.
Budget Approval									
Land Acquisition	X				X				X
Construction:									
Wye Rd./Wal-Mart Access	X								
RR 233 at Ordze Avenue	X								
Trail	X				X				X
Twinning		X				X			X
Intersection Improvements	X				X				X
Access Relocation	X					X			X
Posted Speed Review	X				X				X
RR 232/Wye Road:									
Intersection Review				X					
Intersection Construction					X				

NOTE: Schedule is tentative and subject to budget approvals, land acquisition process, adjacent and developments, traffic vo

1 INTRODUCTION

1.1 BACKGROUND

Earth Tech (Canada) Inc. was retained by Strathcona County to conduct a functional planning study of Range Roads 231, 232, & 233, from Highway 628 to Wye Road. Exhibit 1.1 shows the study area. The impetus for this study has been the increasing pressure of significant growth, particularly in the Urban Service Area. At current rates of growth and development, the Urban Service Area is expected to be fully built out by the year 2016. The County's Municipal Development Plan identifies four areas within Strathcona where a new urban service area may be supported in the future. Two of these areas are south of Sherwood Park and could have a bearing on Range Roads 231, 232, and 233.

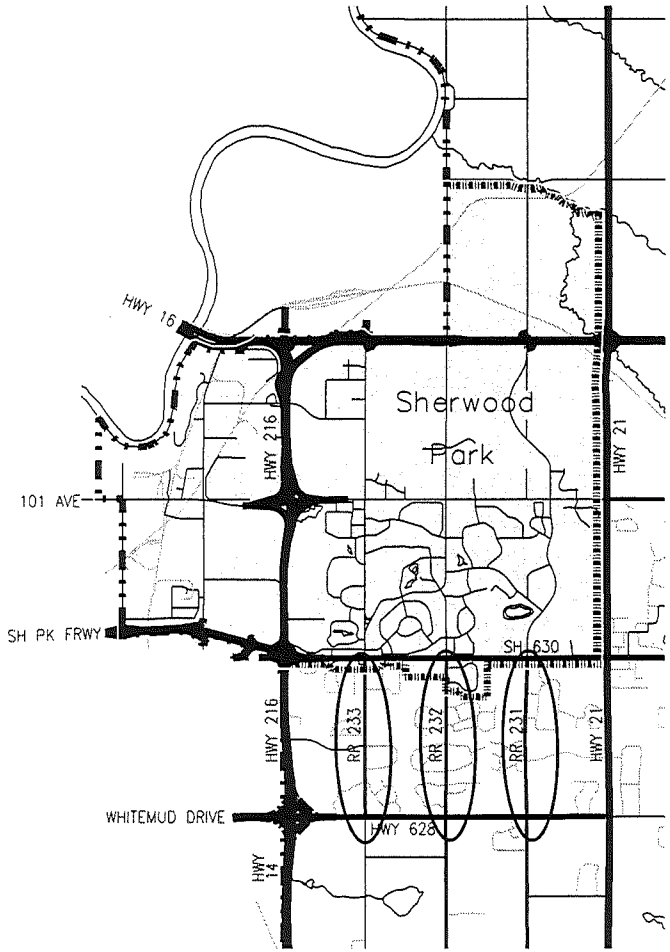
Development in the rural areas of Strathcona County has traditionally been in the form of "country residential" land use with a density of about fifty (50) lots per quarter section. An emerging trend of more intense "estates residential" development has taken root with typical densities in the order of 400 lots per quarter section.

The occurrence of higher development densities south of Sherwood Park in Strathcona County has prompted the County to review future roadway requirements along Range Roads 231, 232 and 233.

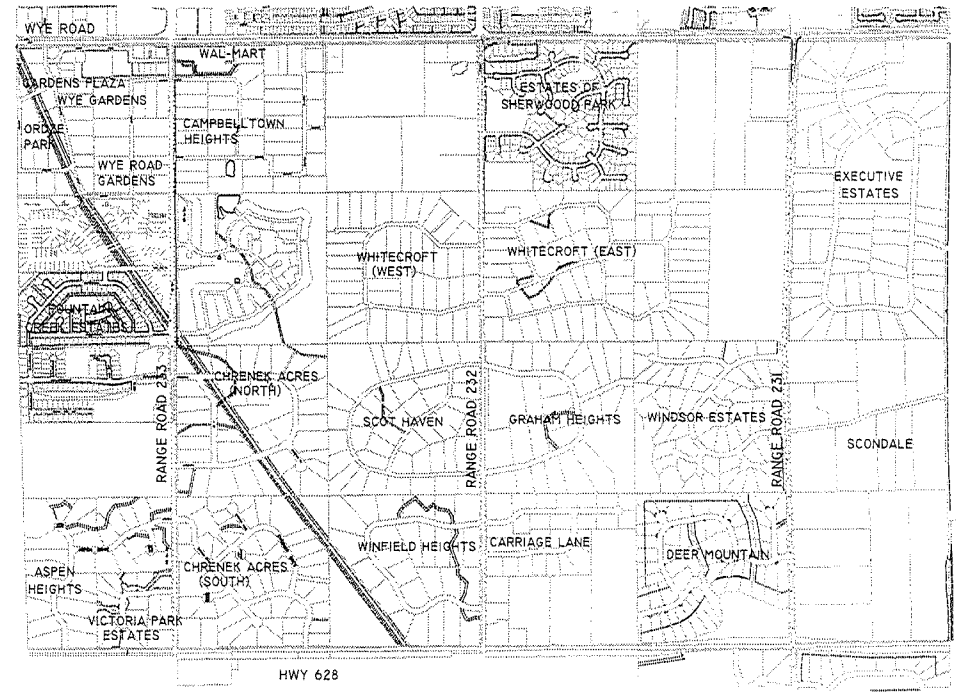
1.2 PROJECT SCOPE AND OBJECTIVES

The following objectives were established for this study:

- Identify roadway upgrading needed to rectify existing deficiencies, to accommodate future growth, and to manage access.
- Ensure compatibility with Highway 628.
- Identify a recommended cross-section, urban or rural, for each of the roadways under consideration
- Identify stormwater management requirements for each of the roadway corridors.
- Identify how pedestrians and other trail users will be accommodated along the upgraded roadways.
- Identify noise attenuation requirements in accordance with County policy for each of the upgraded roadways.



STRATHCONA COUNTY
KEY PLAN
N.T.S.



KEY PLAN
N.T.S.

EXHIBIT 1.1

RANGE ROAD 231,232, & 233
STUDY AREA

PROJECT SITE PLAN
RANGE ROADS 233, 232 and 231
KEY PLAN

Strathcona County

EARTH TECH	SCALE N.T.S.	DRAWN BY W.L.
	FILE 57257	DATE DECEMBER 2002

- Identify right of way requirements to accommodate the recommended roadway cross-sections with all related elements such as drainage, utilities, pedestrian facilities and noise attenuation facilities.
- Identify an implementation strategy based on the priority of the recommended improvements.

1.3 KEY ISSUES

There are a number of key issues that needed to be considered in assessing and identifying an optimal set of operational and/or geometric improvements for Range Roads 231, 232 and 233.

- **Traffic Growth** - Estimates of future increases in traffic were needed in order to help determine required roadway and intersection configurations.
- **Utilities** - Existing and future utilities in and around the road right of way will be reviewed to determine their influence on of future roadway changes.
- **Roadway Alignment** - Future roadway upgrading may entail widening to one, or both sides of the existing alignments. Property, and/or other constraints, such as utilities or bodies of water, may influence alignment choices and selection.
- **Access Management** - There are currently numerous accesses onto Range Roads 231, 232 and 233, between Hwy 628 and Wye Road. The effect of these accesses on the operation and safety of the roadway is of concern. There was a need to consider access management schemes for locations that either merit consolidation of existing accesses, or that may be susceptible to development and access pressure in the future.
- **Intersection Operation and Configuration** – The operation of all intersections along the three range roads in the future is of concern in light of future development on currently agricultural lands. In addition, the County is experiencing congestion and safety issues at the intersection of Range Road 233 and Ordze Avenue, just south of Wye Road.
- **Stormwater Management** - Proper management of stormwater resulting from any changes to the existing roadways were addressed as part of this study.
- **Pedestrian Circulation** - Pedestrian circulation along and across the roadways was an important issue of concern to Strathcona County and its publics.
- **Traffic Noise** - Traffic noise is an issue of concern raised for consideration.
- **Safety** - The safety of the existing roadways and any future changes was assessed during the course of this study. This included roadway geometry, travel speed, speed limits, traffic signs and any roadway or natural features that might influence safety.

2 EXISTING CONDITIONS

2.1 EXISTING LAND USE

2.2 EXISTING TRANSPORTATION NETWORK

Range Roads 231, 232 and 233 connect Wye Road in Sherwood Park at the north end of the study and Highway 628 at the south study limit. All three range roads have a 9 metre paved cross section with two 3.5m lanes and 1 metre wide shoulders. The posted speed limit on all three Range Roads is 80 km/hr.

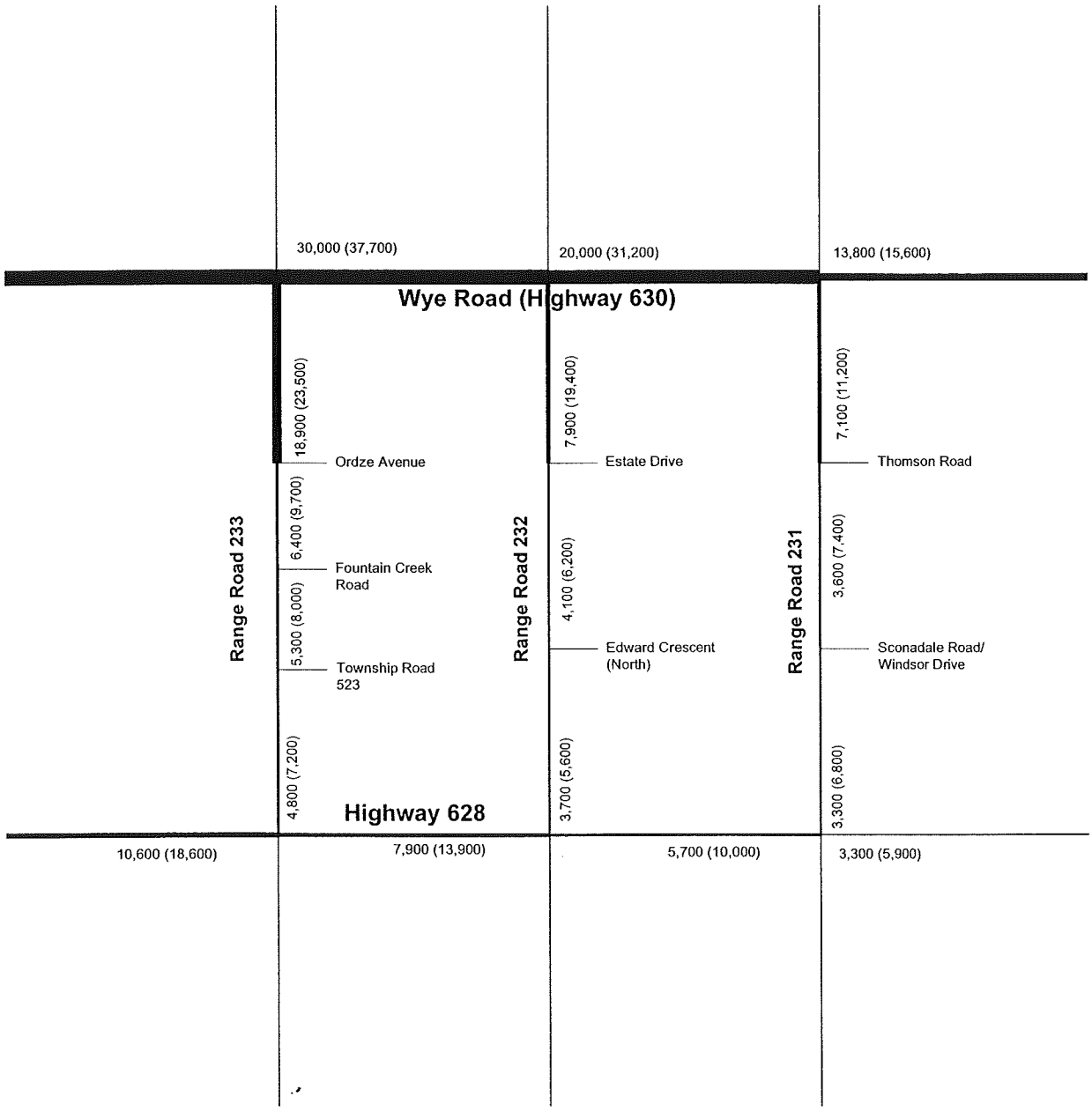
There are five at grade intersections on Range Road 231, ten on Range Road 232 and nine on Range Road 233. These intersections typically consist of subdivision entrances intersecting with the range roads. In addition there are number of individual driveway access points to individual residential acreages and other uses.

2.3 FUTURE TRANSPORTATION NETWORK

The most significant change in the roadway network affecting the study area is the future twinning of Highway 628 by Alberta Transportation at the south end of the study area. In conjunction with the twinning, Alberta Transportation is contemplating the closure of several existing accesses to residential subdivisions north of Highway 628 and rerouting subdivision access to the range roads, which are the subject of a separate study. The rerouting of access from Highway 628 onto the range roads will result in an additional intersection.

2.4 EXISTING TRAFFIC VOLUMES ON RANGE ROADS 231,232 AND 233

In February 2001, Strathcona County completed its Transportation Study 2000, which examined and outlined the County's future (to Year 2016) transportation requirements. The study included traffic projections on the urban and rural roadway networks that were developed with the aid of a calibrated T-Model of the County roadway system. The 2001 annual daily traffic volumes are shown in Table 2.1 and Exhibit 2.1.



NOTE:

18,900 – YEAR 2001 TRAFFIC VOLUME (AADT)

(23,500) – YEAR 2016 TRAFFIC VOLUME (AADT)

EXHIBIT 2.1

RANGE ROADS TRAFFIC VOLUMES EXISTING AND FUTURE

Strathcona County

EARTH TECH	SCALE N.T.S.	DRAWN BY W.L.
	FILE 57257	DATE DECEMBER 2002

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Table 2.1 – Existing Annual Average Daily Traffic

Location	2001 AADT
Range Road 233	
Wye Road to Ordze Avenue	18,900
Ordze Avenue to Fountain Creek Road	6,400
Fountain Creek Road to Township Road 523 (Fountain Creek Boulevard/Chrenek Drive)	5,300
Township Road 523 (Fountain Creek Boulevard/Chrenek Drive) to Highway 628	4,800
Range Road 232	
Wye Road to Estate Drive	7,900
Estate Drive to Edward Crescent (North)	4,100
Edward Crescent (North) to Highway 628	3,700
Range Road 231	
Wye Road to Thomson Road	7,100
Thomson Road to Sconadale Road/Windsor Drive	3,600
Sconadale Road/Windsor Drive to Highway 628	3,300

2.5 TRAFFIC OPERATIONS

The Level of Service (LOS) is a commonly used measure of the quality of traffic conditions experienced along a roadway, or at an intersection. The LOS is typically measured as a function of the delay, and defined as indicated in Table 2.2 for signalized and Unsignalized Two Way Stop Controlled intersection (Exhibit 16-2 & Exhibit 17-2: Highway Capacity Manual 2000). The critical LOS at unsignalized intersections is generally a function of the delay experienced by the minor road left-turn movements.

Table 2.2: Level of Service and Delay Criteria

LOS	Delay Criteria (sec/veh)		Description
	Signalized	Unsignalized (Two Way Stop Controlled)	
A	≤ 10	< 10	Excellent
B	> 10 and ≤ 20	> 10 and ≤ 15	Very Good
C	> 20 and ≤ 35	> 15 and ≤ 25	Good
D	> 35 and ≤ 55	> 25 and ≤ 35	Acceptable

E	> 55 and ≤ 80	> 35 and ≤ 50	Approaching Capacity
F	> 80	> 50	Poor

2.6 IMPACT OF RE-ROUTING ACCESS FROM HIGHWAY 628 TO RANGE ROAD 231 AND RANGE ROAD 233

Alberta Transportation is conducting a Functional Planning Study for Highway 628 between Highway 216 and Highway 21. Access control onto Highway 628 has been addresses within the study limit. A recommendation in the report contemplates the closure of direct subdivision access onto Highway 628 from Aspen Heights and South Chrenek Acres, and the residences south of Carriage Lane and east of Sconaglen. The following section describes the impacts of closing these accesses to Highway 628 and rerouting traffic to Range Roads 231, 232, and 233. The Highway 628 Functional Planning Study has not been finalized and the proposed recommendations have not been adopted by Alberta Transportation.

The following section describes the impacts of the rerouted Highway 628 access traffic on Range Roads 233 and 231 at South Chrenek Acres, Sconaglen and Park Estates respectively. Three time horizons were evaluated for both the AM and PM peak hours:

- Existing
- 2012
- Long term

The volumes used for the range roads were summarized in a spreadsheet (Appendix A provided to Earth Tech by Strathcona County (as originally developed by Stantec Consulting and used in the Highway 628 work for Alberta Transportation).

The volumes for the accesses were generated by using trip generation rates provided by Strathcona County (0.88 vph in the AM and 1.0 vph per dwelling unit in the PM).

	Number of lots	AM trips	PM trips
South Chrenek Acres	53	47	53
Sconaglen and Park Estates	41	36	41

The number of lots were counted from Stantec's cadastral and air photo plan. It was assumed that each lot would contain one dwelling unit and the number of trips generated and the number of dwelling units will not change over time. Other assumptions included:

- Initially, no attempt was made to distribute the trips to the second access in South Chrenek Acres in order to test the sensitivity.
- No trips assigned to the north access of Sconaglen & Park Estates
- The accesses were both considered to have one lane in each direction with no turn bays on the minor (access) roadway
- Left turn bays of 75 metres were assumed on both of the range roads
- No right turn bays were assumed on the range roads
- AM peak traffic was assumed to be 90% exiting and 10% entering through the left turns along to exhibit the worst case scenario.
- PM Peak traffic was assumed to be 80% entering and 20% exiting

The results are summarized in the Table 2.3 below:

Table 2.3 – Operation Analysis at South Chrenek Acres Access

	WBL		SBL	
	V/C	LOS	V/C	LOS
AM existing	.08	B	0	A
AM 2012	.14	C	0	A
AM long term	.15	C	0	A
PM existing	.03	C	.04	A
PM 2012	.04	C	0.04	A
PM long term	.05	C	.05	A

Table 2.4 – Operational Analysis at Sconaglen and Park Estate Intersections

	WBL		SBL	
	V/C	LOS	V/C	LOS
AM existing	.06	B	0	A
AM 2012	.07	B	0	A
AM long term	.08	B	0	A
PM existing	.02	B	.03	A
PM 2012	.02	B	.03	A
PM long term	.02	C	.03	A

As can be seen from the assessment above, the accesses are anticipated to operate at LOS C or better even with long term volumes and no significant geometric improvements.

In order to test the sensitivity of the above results to changes in traffic volume, the traffic anticipated to be generated by each area was doubled for the long term AM and long term PM and applied with 50% inbound and 50% outbound split, all assigned to left turn movements. The LOS is anticipated to be "D" or better even with the neighborhood traffic doubled and all of the traffic assigned to the new access locations. (Chernek Estates WBL in the PM peak was anticipated to operate at LOS "D" – All of the other movements were estimated to operate at LOS "C" or "A")

2.7 RANGE ROAD 233 AND ORDZE AVENUE INTERSECTION PERFORMANCE

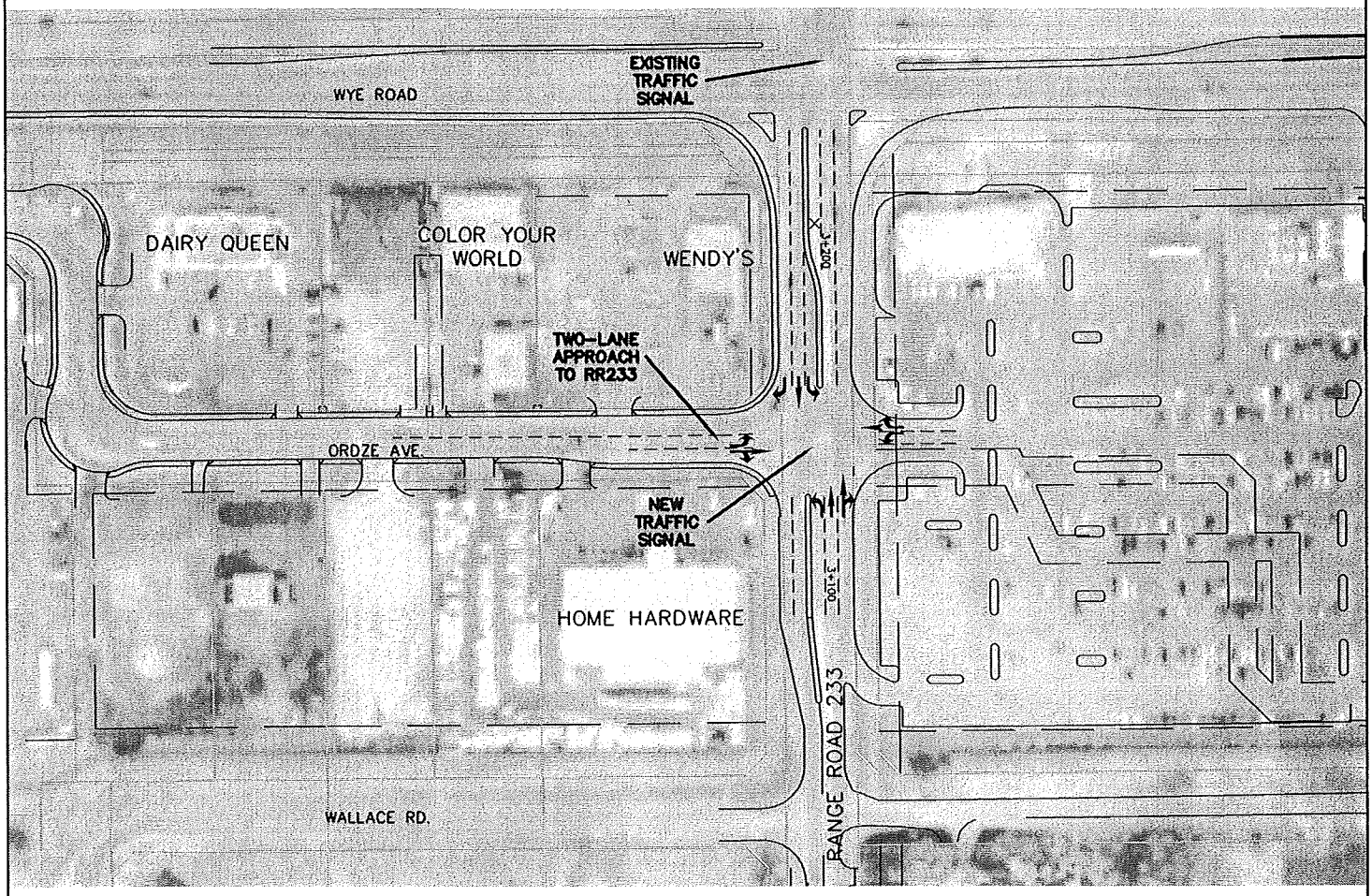
The Wye Road corridor in Sherwood Park is heavily developed with commercial developments that include retail, food, automotive and restaurant uses. The traffic generated by these developments is causing significant congestion on Wye Road during the pm peak hour, particularly at the north end of Range Road 233. In addition to congestion on Wye Road at Range Road 233, there is significant congestion and access difficulties on Range Road 233 at Ordze Avenue. This intersection is currently unsignalized and the focus of access to both the Wal-Mart store on the east side of Range Road 233, as well as access to numerous commercial sites west of Range Road 233. The proximity of the Ordze Avenue intersection to Wye Road exacerbates the congestion and access difficulties, as there is a very limited amount of intersection storage and queuing space available between the two intersections.

In order to assess remedial measures at this location Earth Tech developed and analysed four alternatives. The Synchro base network for the area was provided by Strathcona County. This base network included existing volumes and signal timing information. Earth Tech supplemented this information with a count of the right in and right out turning movements for the PM peak on the south side of Wye Road west of the Range Road 233 intersection. The existing lane configuration consists of a left turn bay, and a shared through/right lane.

The alternatives examined are summarized below

- **Alternative 1**: installing traffic signals at the intersection of Sherwood Drive and Ordze Avenue. This alternative included improving the eastbound movements to include a left turn bay and a shared through/right turn lane. The Alternative 1 lane configuration is shown in Exhibit 2.2 and traffic volume corresponding to this alternative is shown in Exhibit 2.2a

NORTH



IMPROVEMENTS:

- **TRAFFIC LIGHT AT RANGE ROAD 233/ ORDZE AVE.**
- **ORDZE AVE. WIDENED TO PROVIDE LEFT TURN BAY AND SHARED THROUGH/RIGHT LANE APPROACHING RANGE ROAD 233**
- **ALL MOVEMENTS PERMITTED**

EXHIBIT 2.2

ALTERNATIVE 1
RANGE ROAD 233 & ORDZE AVENUE INTERSECTION IMPROVEMENT

Strathcona County

EARTH TECH	SCALE 1:2000	DRAWN BY DA
	FILE 57257	DATE FEBRUARY 2004

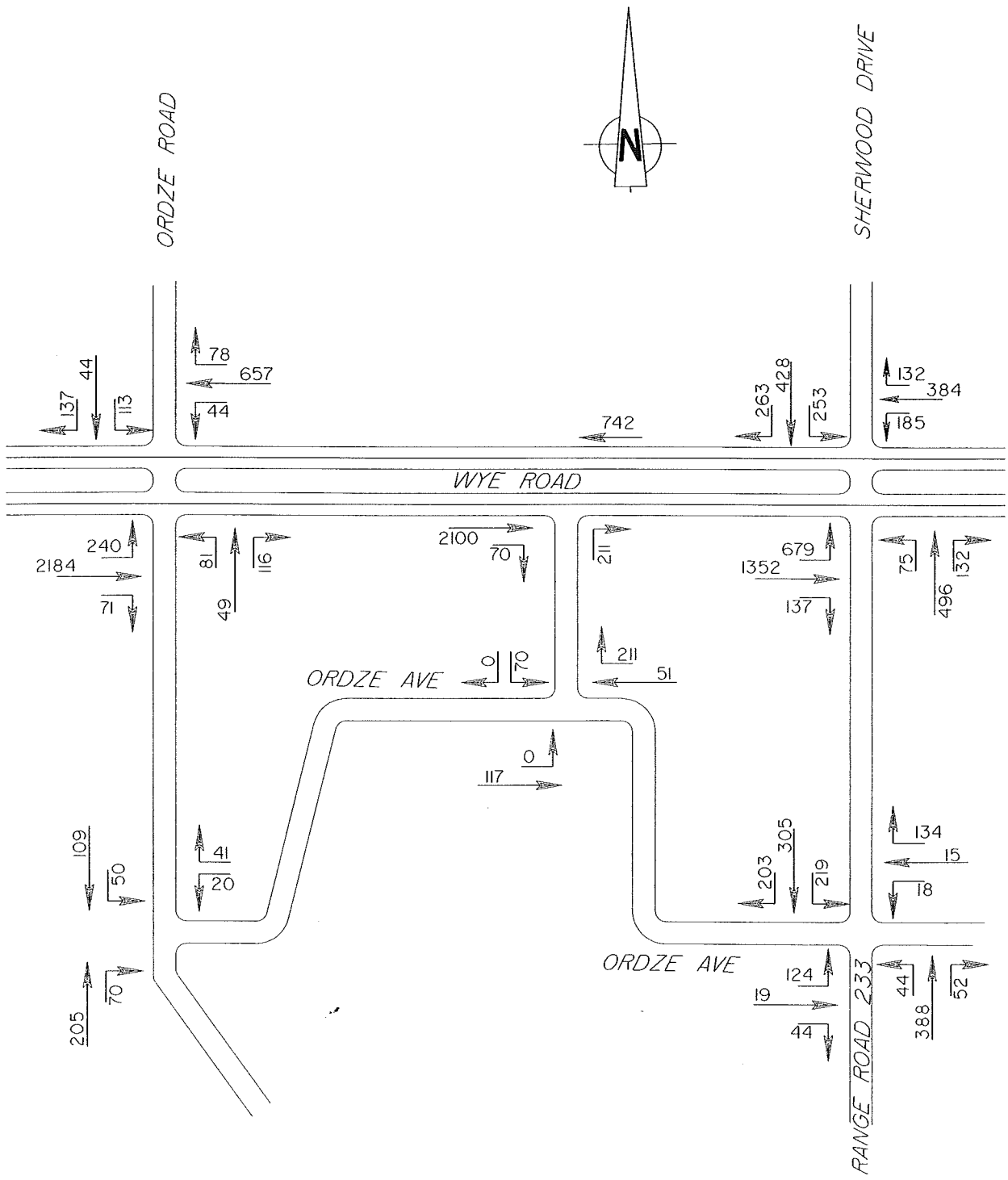


EXHIBIT 2.2a

ALTERNATIVE 1
PM PEAK HOUR VOLUMES - EXISTING
WYE ROAD

Strathcona County

EARTH TECH

SCALE N.T.S.	DRAWN BY W.L.
FILE 57257	DATE DECEMBER 2002

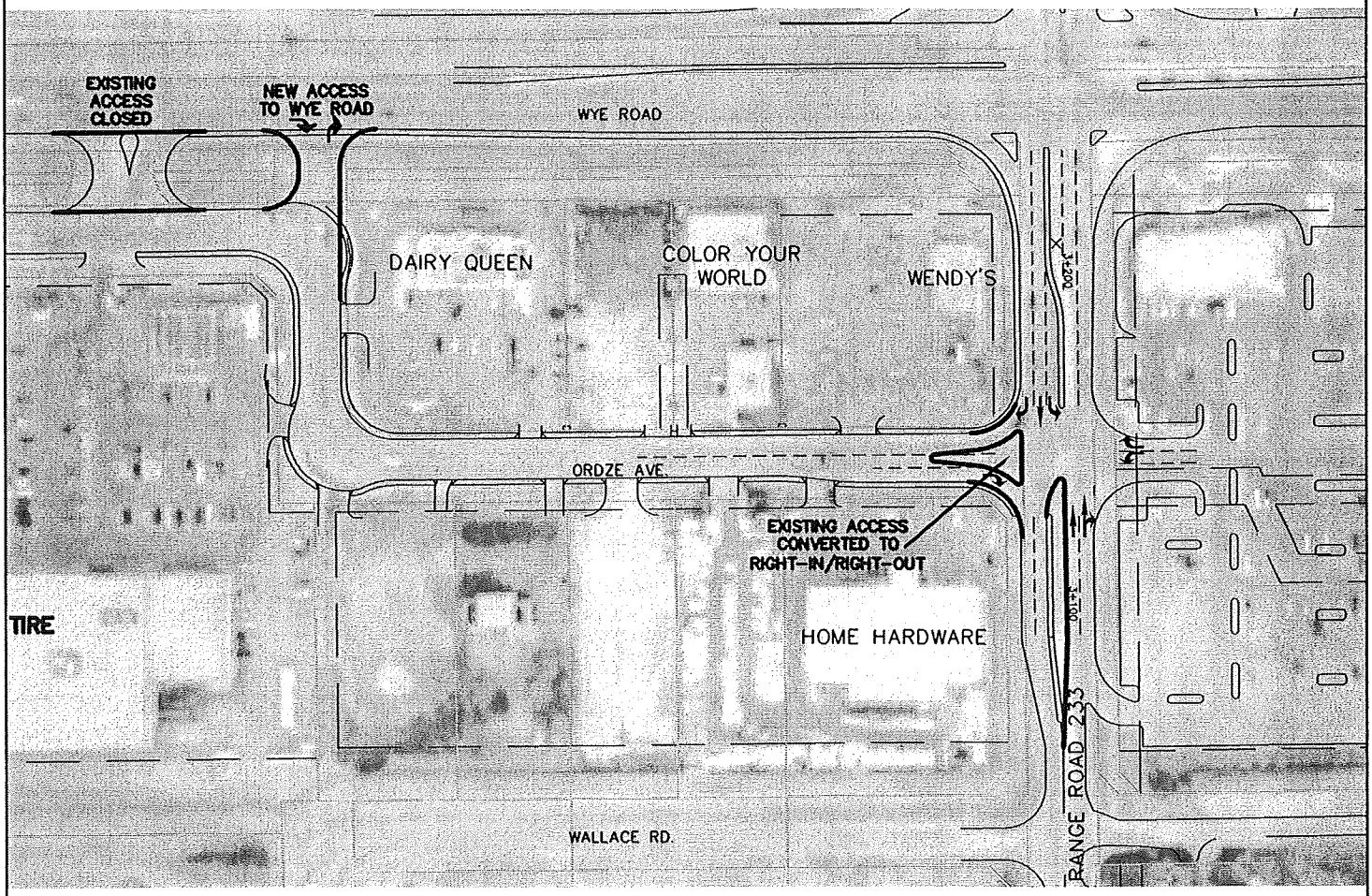
- **Alternative 2**: No signalization at the intersection and a concrete island that would restrict movements to right in/right out. The restricted movements were reassigned along Ordze Avenue, the Ordze Road and Wye Road. This alternative is illustrated in Exhibit 2.3 and the traffic volumes are shown in Exhibit 2.3a.
- **Alternative 3**: Concrete island installed on Ordze Avenue restricting eastbound movements on Ordze Avenue. This alternate is illustrated in Exhibit 2.4. The restricted movements were reassigned along Ordze Avenue, the Ordze Road and Wye Road. These volumes are shown in Exhibit 2.4a.
- **Alternative 4**: Additional WB left in access provided to Wal-Mart from Wye Road, both with and without a traffic signal at Ordze Avenue and Range Road 233. This alternative is shown in Exhibit 2.5 and the traffic volumes are shown in Exhibit 2.5a.

The traffic was then re-assigned for any banned movements and the Synchro model run for each of the scenarios as described above. Some changes to the model were made in order to accommodate the additional service road and access points added. The NBR turn bay at Ordze Road and Wye Road, and the WBR turn bay at the Safeway access were made shorter to accommodate the new nodes that were added.

The Synchro results for the intersection of Ordze Avenue and Range Road 233 are summarized below: Synchro outputs are presented in Appendix B.

Table 2.5 – Operational Level of Service on Ordze Avenue and Range Road 233

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (PM Peak)	124	19	44	18	15	134	44	388	52	219	305	203
Existing												
	F	C	C	E	C	C	A	A	A	A	A	A
Alternative 1												
	B	A		B	A		A	A	A	A	A	A
Alternative 2												
	-	-	B	F	-	B	-	A	A	A	A	A
Alternative 3												
	-	-	B	F	C	C	A	A	A	A	A	A
Alternative 4 without signals												
	F	C	C	D	B	B	A	A	A	A	A	A
Alternative 4 with signals												



IMPROVEMENTS:

- **CONCRETE ISLAND INSTALLED ON ORDZE AVE. AT RANGE ROAD 233, RESTRICTING MOVEMENTS TO RIGHT-IN/RIGHT-OUT**
- **EXISTING ACCESS, FROM ORDZE AVE TO WYE RD., RELOCATED FURTHER EAST**

EXHIBIT 2.3

ALTERNATIVE 2
RANGE ROAD 233 & ORDZE AVENUE INTERSECTION IMPROVEMENT

Strathcona County

EARTH TECH	SCALE 1:2000	DRAWN BY DA
	FILE 57257	DATE FEBRUARY 2004

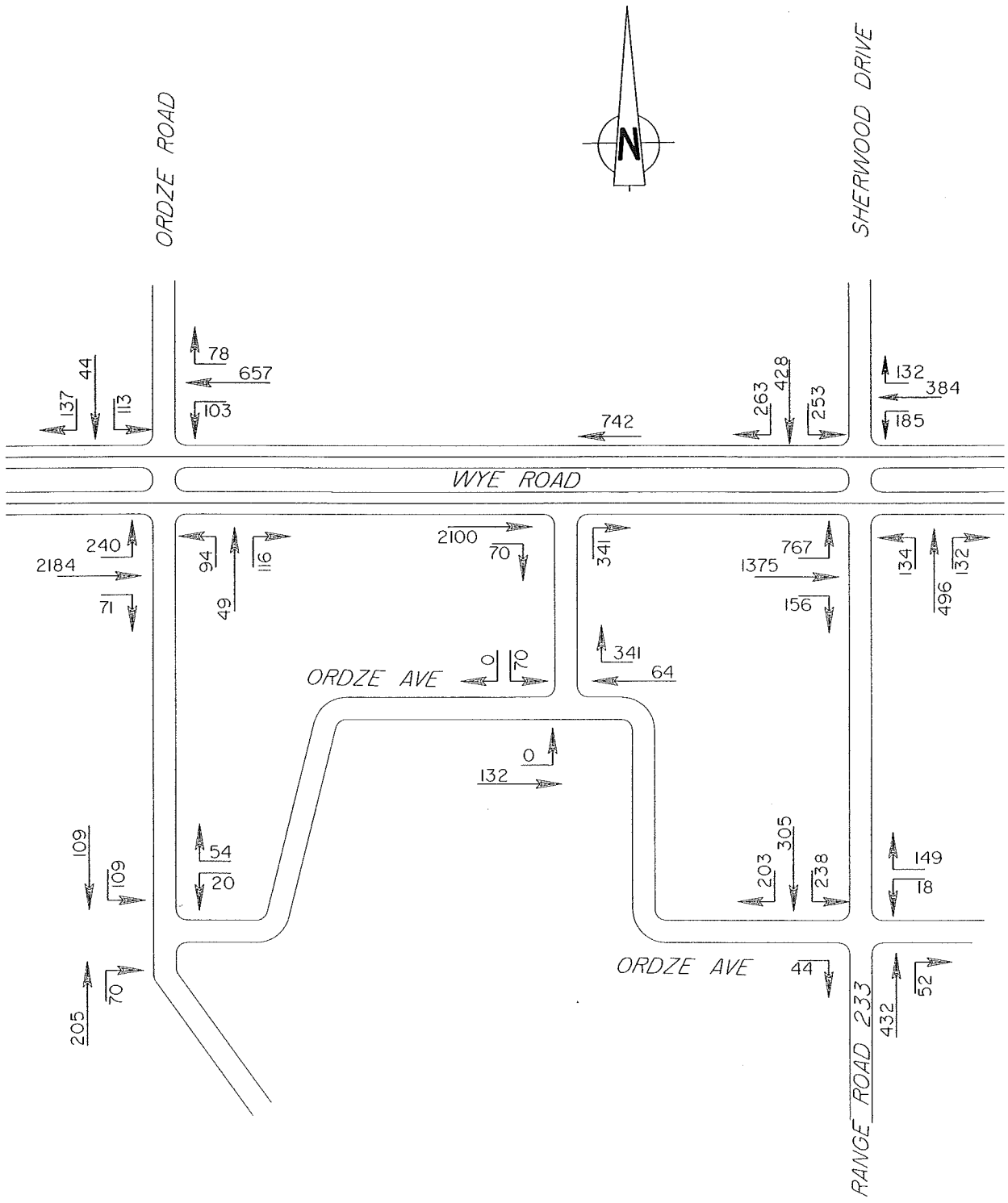


EXHIBIT 2.3a

ALTERNATIVE 2
PM PEAK HOUR VOLUMES - EXISTING
WYE ROAD

Strathcona County

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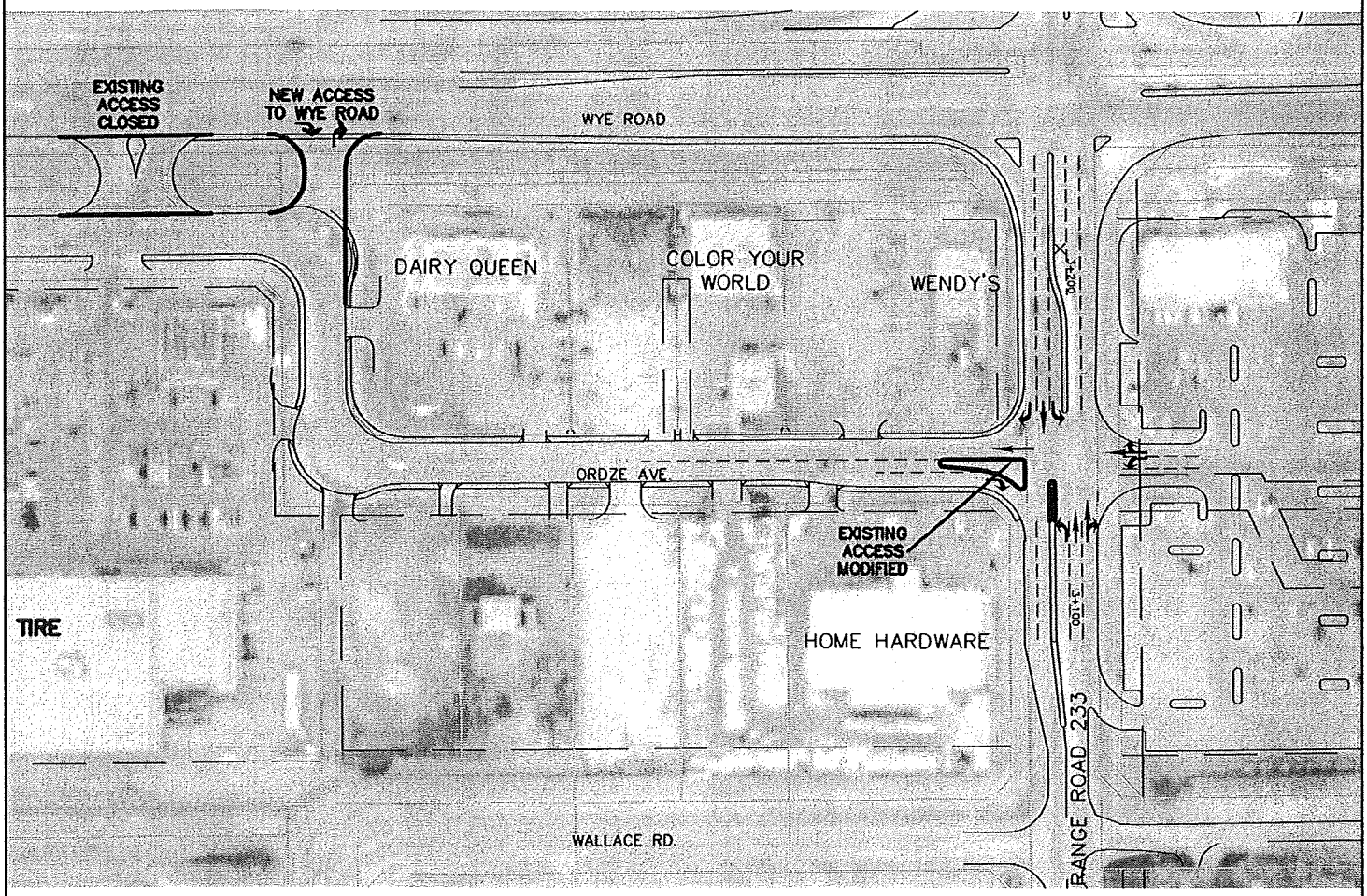
	FILE 57257	DATE DECEMBER 2002



IMPROVEMENTS:

- **CONCRETE ISLAND INSTALLED ON ORDZE AVE. AT RANGE ROAD 233, RESTRICTING EASTBOUND MOVEMENTS ON ORDZE AVE.**
- **EXISTING ACCESS, FROM ORDZE AVE. TO WYE RD. RELOCATED FURTHER EAST**

EXHIBIT 2.4

ALTERNATIVE 3
RANGE ROAD 233 & ORDZE AVENUE INTERSECTION IMPROVEMENT

Strathcona County

EARTH TECH	SCALE 1:2000	DRAWN BY DA
	FILE 57257	DATE FEBRUARY 2004

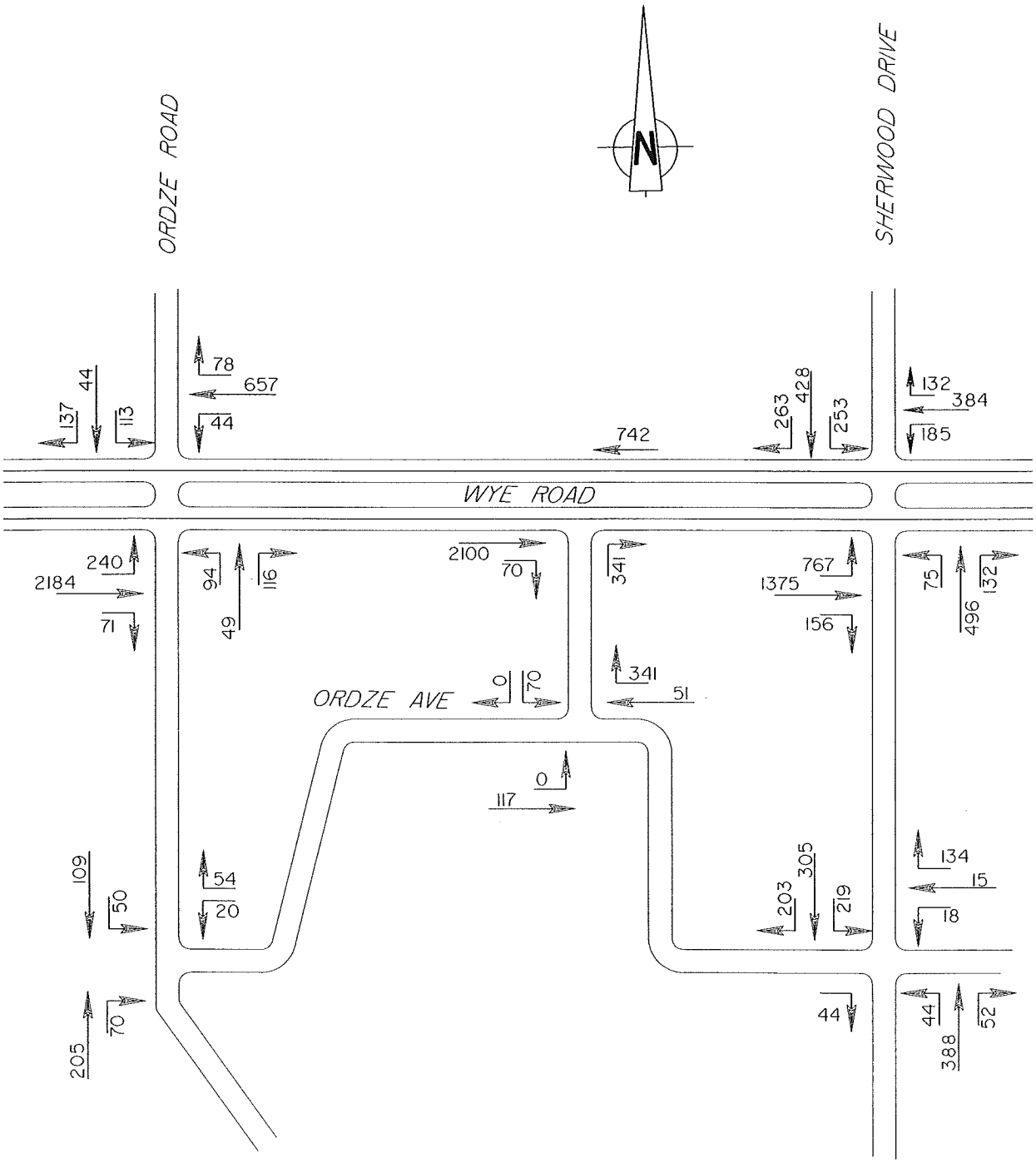
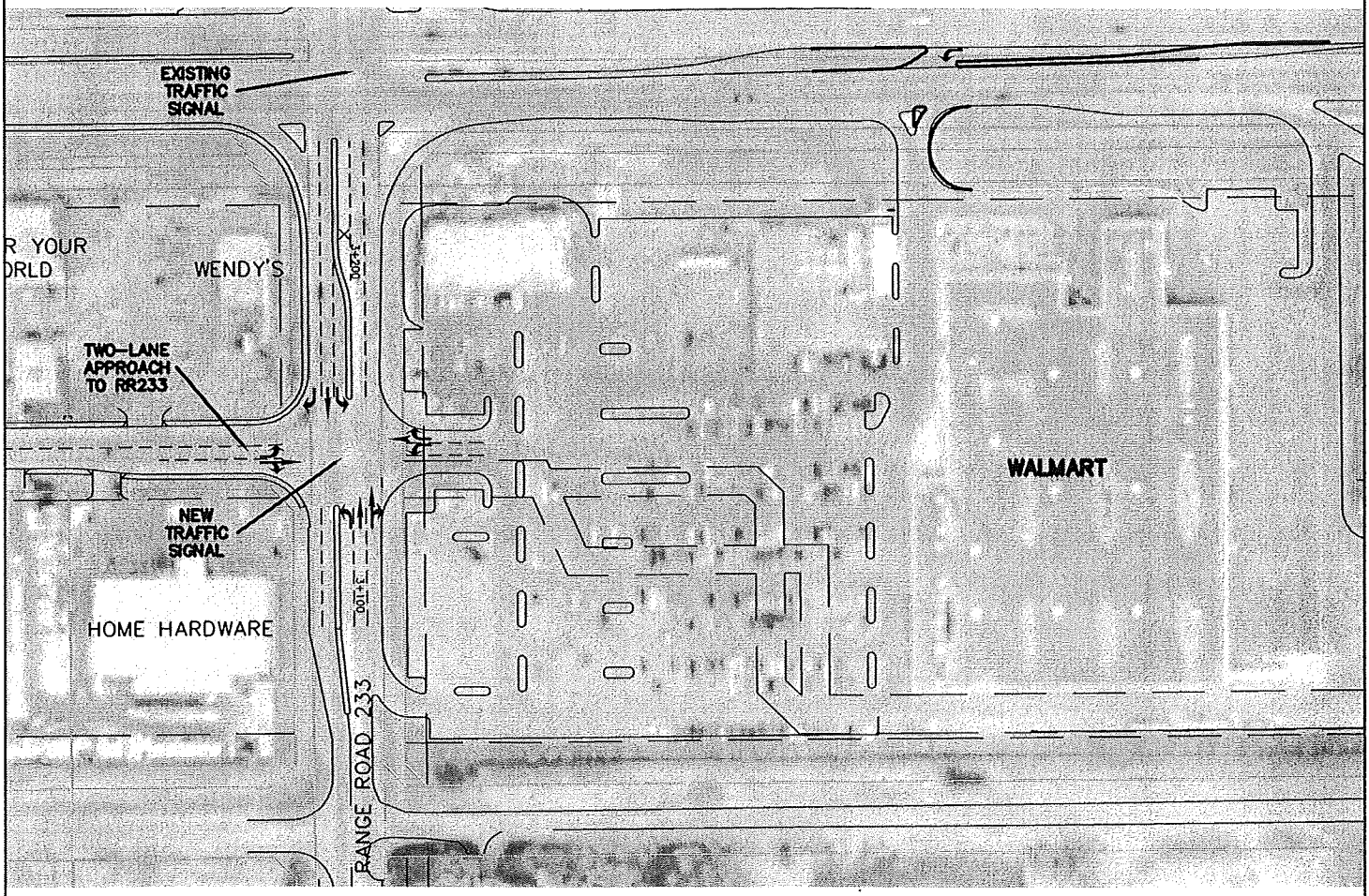


EXHIBIT 2.4a

ALTERNATIVE 3 PM PEAK HOUR VOLUMES - EXISTING WYE ROAD		Strathcona County
EARTH TECH	SCALE N.T.S.	DRAWN BY W.L.
	FILE 57257	DATE DECEMBER 2002



IMPROVEMENTS:

- **LEFT TURN BAY TO WALMART AT WYE ROAD**

EXHIBIT 2.5

ALTERNATIVE 4
RANGE ROAD 233 & ORDZE AVENUE INTERSECTION IMPROVEMENT

Strathcona County

EARTH TECH	SCALE 1:2000	DRAWN BY DA
	FILE 57257	DATE FEBRUARY 2004

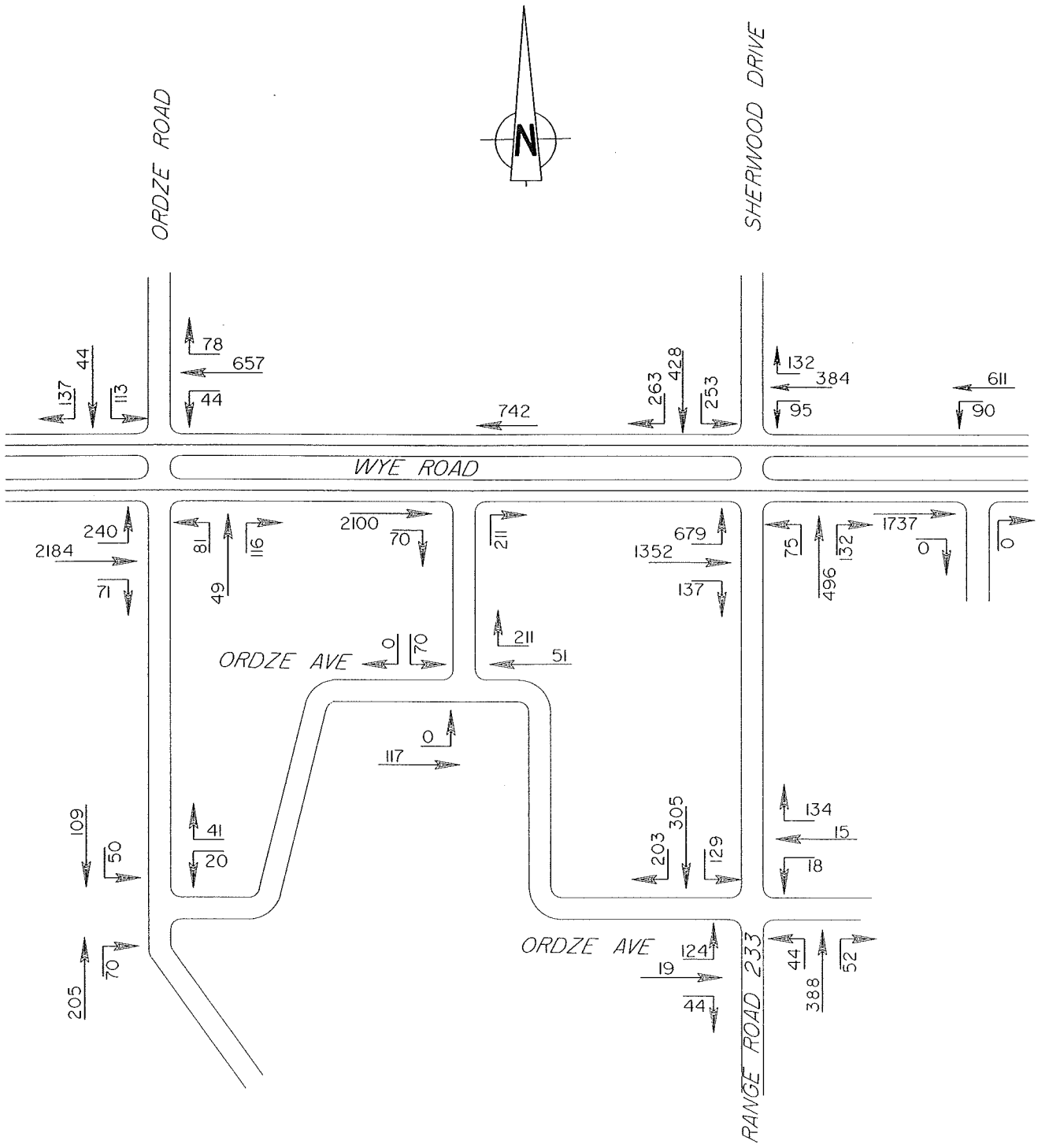


EXHIBIT 2.5a

ALTERNATIVE 4
PM PEAK HOUR VOLUMES - EXISTING
WYE ROAD

Strathcona County

EARTH TECH	SCALE N.T.S.	DRAWN BY W.L.
	FILE 57257	DATE DECEMBER 2002

	B	A		B	A		A	A		A	A	A

These results shown that there are movements expected to operate at LOS F in all of the scenarios that do not include a traffic signal at Ordze Avenue and Range Road 233, including the existing conditions. Alternative 1 which includes a signal, is anticipated to operate with all movements at LOS B or A. The improved geometry proposed with Alternative 1 does not change the LOS for these movements from the LOS that could be anticipated with the existing geometry and signalization although the delay improves marginally.

The Synchro results for the intersection of Wye Road and Range Road 233 are summarized in Table 2.6 below:

Table 2.6 –Level of Service at Wye Road and Range Road 233

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (PM Peak)	767	1375	156	95	384	132	75	132	132	253	428	263
Existing												
	B	D	C	B	C	B	C	D	C	D	D	
Alternative 1												
	B	C	C	B	C	B	C	D	C	D	D	
Alternative 2												
	B	D	C	B	C	B	C	D	C	D	D	
Alternative 3												
	B	D	C	B	C	B	C	D	C	D	D	
Alternative 4 without signals												
	B	C	C	B	C	B	C	D	C	D	D	
Alternative 4 with signals												
	B	C	C	B	C	B	C	D	C	D	D	

This shows that Alternative 2 and 3 could impact the EBT movement at the Wye Road and Sherwood Drive intersection. Alternatives 1 and 4 show no noticeable impacts to the Wye Road and Sherwood Drive intersection.

The Synchro results for the right in – right out access to Wye Road west of Sherwood Drive are summarized in Table 2.7 below.

Table 2.7 – Operational Level of Service on Wye Road west of Sherwood Drive

	NBR		
	V/C	LOS	Delay
Existing			
	.55	C	25
Alternative 1			
	.55	C	25
Alternative 2			
	.88	F	54.2
Alternative 3			
	.88	F	54.2
Alternative 4 without signals			
	.55	C	25
Alternative 4 with signals			
	.55	C	25

Once again, Alternative 1 and 4 have no noticeable impacts on the access while Alternatives 2 and 3 see the LOS for the northbound right turn movement drop from C to F. The main street is not affected by this however, and even though the movement is anticipated to operate at LOS F, the delay is not expected to exceed one minute.

Conclusions

- Existing operations at the intersection of Ordze Avenue and Range Road 233 have movements that are at LOS E-F
- Signalizing the intersection of Ordze Avenue and Range Road 233 results in improved operations with no perceivable negative impacts at the Wye road and Range Road 233 intersection.
- The other alternatives that include restricting movements at Ordze Avenue and Range Road 233, cause the right in-right out access onto Wye Road to exceed capacity.
- The WB left turn access into the Wal-Mart is anticipated to improve intersection operations at the Wye road and Range Road 233 intersection.

These results indicate that signalization at Ordze Avenue would improve the LOS for the intersection with little impact on the surrounding network. Further improvements would be noticed at the Wye Road intersection if a WB left in access were provided to the Wal-Mart site.

The County added traffic signals in 2003 and reconfigured the geometry of the intersection to include a left turn bay and a through/right lane.

2.8 SAFETY

As per the residence complaint the main factor for accidents is the speed. Spot speed surveys were conducted on all three roads by Strathcona County. The data are shown in Appendix C. The 85th percentile speed as recorded during the survey were 91.9, 85.8 and 84.4 km/hr on Range Roads 231, 232 and 233 respectively. The percentage of vehicles travelling faster than posted speed of 80 km/hr were 61, 41 and 38 % on Range Roads 231, 232 and 233 respectively.

As part of this study, a Road Safety Audit was carried out by Earth Tech on existing road condition to identify potential safety issues in the planning of the roadways and make recommendations to rectify these deficiencies to implement in to the recommended functional plan. A summary of the safety audit comments are summarised in the following section. A detailed Road Safety Audit report is presented in the Appendix D.

Range Road 231

- Southbound two lane to one lane transition south of Wye Road seems short. Consider extending two southbound lanes further south before merging. TAC guidelines suggest 100 to 175 metres of parallel lane followed by 100 metres taper.

- Provide continuous median between Windsor Drive accesses. A continuous median width may reduce the likelihood of head-on collision between opposing directions of traffic, and may reduce driver task workload.

- A shortened sight distance was felt at Sconadale/Windsor Drive intersection. The slope of the side street in combination with vertical curve of Range Road 231 seems to reduce sight distance and limits driver comfort in decision making. Consider providing the required sight distance for vehicles turning left from the side streets. In the long term, consider lowering or flattening the vertical.

- Access management plan for the length of the road to be implementing by reducing the frequency of accesses.

Range Road 232

- Southbound lanes on Range Road 232 north of intersection were discontinuous; the right hand lane curbside lane end abruptly at Wye Road. This lane needs to be continued through and should be included in the preliminary functional design.
- South of Wye Road two lane to one lane merging lanes should be increased to 100m.
- Salisbury Greenhouses – Most users were headed to or from the north, and were consistently using the northerly business access. Consider providing a southbound left turn slot for the northerly access since demand appears to prefer this access.
- Private Access at Sta 3+130 – This access is closely located to Wye Road preventing to have separate left turn lane for Wye Road.
- Access Management – Plan should be implemented to proactively address accesses for future development.

Range Road 233

- Private accesses are numerous. Consider access management between Sta. 2+380 to 2+540. Consider relocating northbound diverge lane north beyond access at Sta. 2+540.
- Consider lengthening two to one south bound merge conditions to 100m.

3 FUTURE CONDITIONS

3.1 FUTURE GROWTH

Strathcona County is planning to create a new urban area to accommodate future growth. Four locations have been considered to accommodate this growth. This new urban area is expected to accommodate 50,000 additional people. There are four areas under consideration. Two are located south of Sherwood Park and two are located east of Highway 21. The exact location of the new urban area is under consideration and is being kept confidential in order to minimize land speculation. Depending on which areas is chosen, there may be some impact on traffic volumes on the Range Road, however, traffic volumes from the potential future urban service area have not been included.

Two future developments along the Range Road 233 are in planning stage; Balmoral Heights north of Fountain Creek Estates on west side of the Range Road 233 and Sherwood Park Golf Course north of Chrenek Estates on east side of the Range Road 233. As per the Traffic Impact Assessment conducted by Infrastructure Systems Ltd., there will be 115 projected residential units in Balmoral Heights and 224 units in Sherwood Park Golf Course. The developers have suggested that the existing intersection at Fountain Creek Road will be relocated north of existing intersection.

3.2 FUTURE TRAFFIC PROJECTIONS

In order to determine appropriate improvement plans for the roadways under study, Earth Tech reviewed the traffic projections developed in the Transportation 2000 Study as well as more recent traffic count data obtained from Strathcona County. As a result of this review, it was determined that on some link volumes for the Year 2016 traffic projections documented in the Transportation 2000 study were already being exceeded in the Year 2001, or that growth was exceeding what was previously assumed. As a result, it was felt that projections for the Year 2016 needed to be adjusted upwards to reflect the changes that had occurred.

A summary of the projected annual average daily traffic volumes on the Range Roads 233, 232, and 231 are given in Table 3.1 and Exhibit 2.1. The growth factors from Transportation 2000 Study were used to generate these volumes. The highest long term 24 hour 2 way volumes are anticipated to be 23,500 at the north end of Range Road 233. Based on ISL's TIA study for the proposed future development near Fountain Creek Road, there will be increase in traffic volume along the Range Road 233. Based on ISL's

TIA study, the future PM peak traffic volume along north leg of Range Road 233 (Fountain Creek Road Intersection) will be 1019 vehicles per hour. The next highest volume is 19,400 on the extreme north section of Range Road 232. This volume may also warrant twinning for a portion of the roadway south of Wye Road; currently, the road has a northbound left turn lane developed, but is not twinned. The third highest volume roadway is the north section of Range Road 231, which is anticipated to carry 11,200 vehicles in a 24 hour period.

At the south end of the study area, near Highway 628, projected daily traffic volumes are expected to range from 5,600 to 7,200 vehicles per day. Independently developed estimates of long term volumes for the three range roads developed for Alberta Transportation's study of Highway 628, indicate volumes in the 5,100 to 7,300 range for the three range roads.

Table 3.1 Projected Traffic Volumes

Location	2016 Projected AADT	Growth Factor
Range Road 233		
Wye Road to Ordze Avenue	23,500	1.24
Ordze Avenue to Fountain Creek Road	9,700	1.51
Fountain Creek Road to Township Road 523 (Fountain Creek Boulevard/Chrenek Drive)	8,000	1.51
Township Road 523 (Fountain Creek Boulevard/Chrenek Drive) to Highway 628	7,200	1.50
Location		
Range Road 233	19,400	2.46
Estate Drive to Edward Crescent (North)	6,200	1.51
Edward Crescent (North) to Highway 628	5,600	1.51
Location		
Range Road 233	11,200	1.58
Thomson Road to Sconadale Road/Windsor Drive	7,400	2.06
Sconadale Road/Windsor Drive to Highway 628	6,800	2.06

Note: This table excludes impact of potential future urban service area

3.3 ROADWAY TWINNING REQUIREMENTS

The need to twin a roadway is dependent on its carrying capacity, the anticipated volume of traffic projected to use the roadway and any safety issues that need to be rectified. The carrying capacity of any roadway link is typically determined on a per hour basis, rather than a daily basis. It is therefore more instructive to examine peak hour conditions rather than daily figures. Table 3.2 has been generated indicating estimated peak hour link volumes.

Highway Capacity Software was used to determine the threshold traffic volume for Various Level of Services "LOS" for a two lane road. A threshold Level of Service "C" was used to determine the need of twinning the existing roadway. Following table shows the limits of two-way traffic volume for various LOS.

Table 3.2 – Two Lane Traffic Capacity and Level of Services

Two Lane Volume (Veh/Hr)		LOS
From	To	
1	230	A
231	420	B
421	**890**	**C**
891	1680	D
1681	2160	E
	> 2160	F

The following assumptions have been made in developing Table3.3:

- PM peak hour volume ~ 10% of daily Volume

Table 3.3: Twinning Warrant

Location	2016 Projected AADT	PM Peak Hour Volume (Both Ways) vph	Twinning Threshold Volume (Both ways) vph	LOS	Twinning Warrant
Range Road 233					
Wye Road to Ordze Avenue	23,500	2,350	890	> E	Yes
Ordze Avenue to Fountain Creek Road	9,700	970	890	D	Yes
Fountain Creek Road to Township Road 523 (Fountain Creek Boulevard/Chrenek Drive)	8,000	800	890	C	No
Township Road 523 (Fountain Creek Boulevard/Chrenek Drive) to Highway 628	7,200	720	890	C	No

Range Road 232					
Wye Road to Estate Drive	19,400	1,940	890	E	Yes
Estate Drive to Edward Crescent (North)	6,200	620	890	C	No
Edward Crescent (North) to Highway 628	5,600	560	890	C	No
Range Road 231					
Wye Road to Thomson Road	11,200	1,120	890	D	No
Thomson Road to Sconadale Road/Windsor Drive	7,400	740	890	C	No
Sconadale Road/Windsor Drive to Highway 628	6,800	680	890	C	No

Note: This table excludes impact of potential future urban service area.

Based on the daily and peak hour volume projections developed for the roadways under study, the following conclusions are drawn:

- Range Road 233 needs to be twinned to new Fountain Creek Road.
- Range Road 232 needs to be twinned to Estate Drive.
- Range Road 231 needs be twinned To Thomson Road.
- Intersection channelization is recommended at all subdivision entrances regardless of whether twinning is to occur.

The total length of twinning required based on LOS "C" is 2300m.

4 FUNCTIONAL PLANNING

4.1 ROADWAY CLASSIFICATION

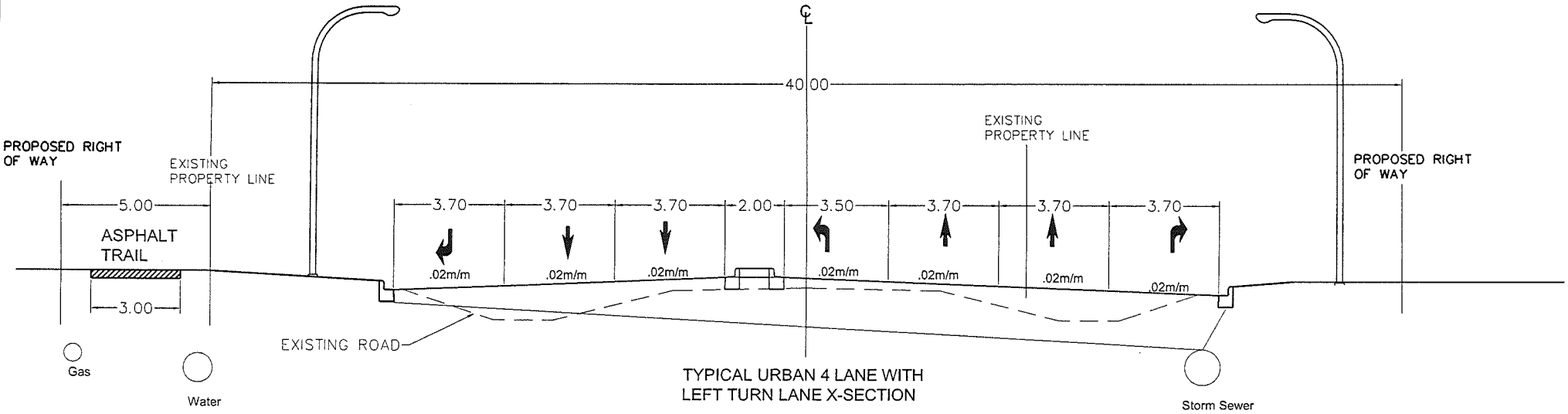
As per the 2000 Rural Roads Master Plan, all three Range Roads are classified as a County Class 1 Roads.

4.2 CROSS SECTION

The Geometric Design Guide for Canadian Roads specifies that with a peak hour design volume of 250-450 vehicles per hour, a lane width of 3.5m to 3.7m is recommended. Based on future traffic volumes, all of the range roads will require a 3.7m lane width. Based on the future traffic volume, all stretch of the Range road will require a 3.7m lane width. A 3m asphalt trail constructed with 65mm asphalt, 150mm base gravel and 150mm subgrade preparation, would be located on either the east or west side of the Range Road. The right of way will be based on the requirement to accommodate the proposed road cross-section improvement with trail and will be 45m wide. The existing right of way is maintained at locations where the need for widening is about one to two metre only. A typical urban and rural cross-section is shown in Exhibits 4.1 and 4.2. A four lane rural cross-section requires more than 40m right of way. Hence, an urban cross-section has been proposed for the stretch of road where four laning is required.

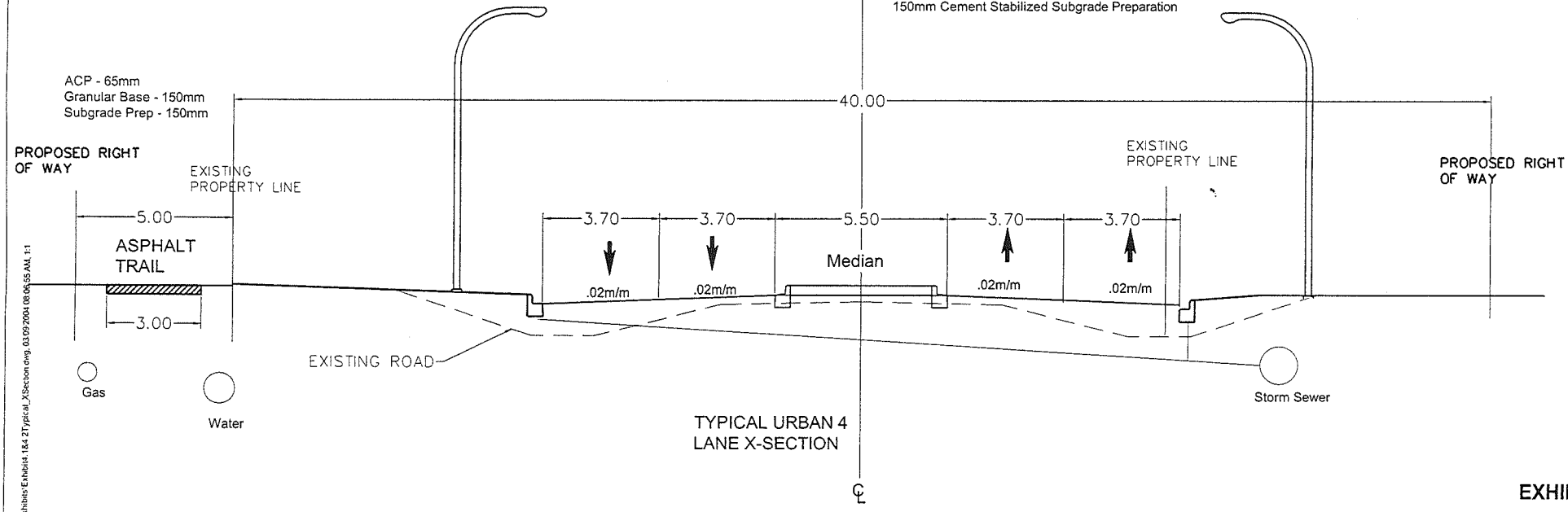
The County's standard for a Class I Rural Road is a two lane road within a 40 metre wide right-of-way. An additional 5 metres will accommodate a 3metre wide trail. The Range Roads will all be comprised of four lane road. The four laning will occur south of Wye Road for a distance, transitioning to two lanes as traffic volumes decrease. The 45 metre right-of-way will accommodate a four lane divided urban road and trail. In the future if traffic demand warrants, the four lane urban road sections could be extended further south.

Widening is based on the utilization of existing roadway. It is proposed to widen both sides of the existing road. The major residential roadway pavement structure (B-29/B-28 Urban) was used. This consists of 200mm of 20mm Granular Base Course, 100mm Type III Asphalt Base Course and 50mm of Type ACO Asphalt Surface Course. The overlay on existing pavement will have to be determined during design stage. For estimation purpose the overlay thickness is assumed to be 50mm Type III Asphalt Base Course and 50mm of Type ACO Asphalt Surface Course. A typical widening details is shown in Exhibit 4.3 and widening details at about Station 1+720 along Range Road 232 is given in Exhibit 4.4.



TYPICAL URBAN 4 LANE WITH LEFT TURN LANE X-SECTION

50mm Type ACO Asphalt Surface Courcse
100mm Type III Asphalt Base COurse
200mm Granular Base Course
150mm Cement Stabilized Subgrade Preparation



TYPICAL URBAN 4 LANE X-SECTION

EXHIBIT 4.1

TYPICAL URBAN CROSS-SECTIONS

Strathcona County

EARTH TECH	SCALE N.T.S.	DRAWN BY D.A.
	FILE 57257	DATE DECEMBER 2003

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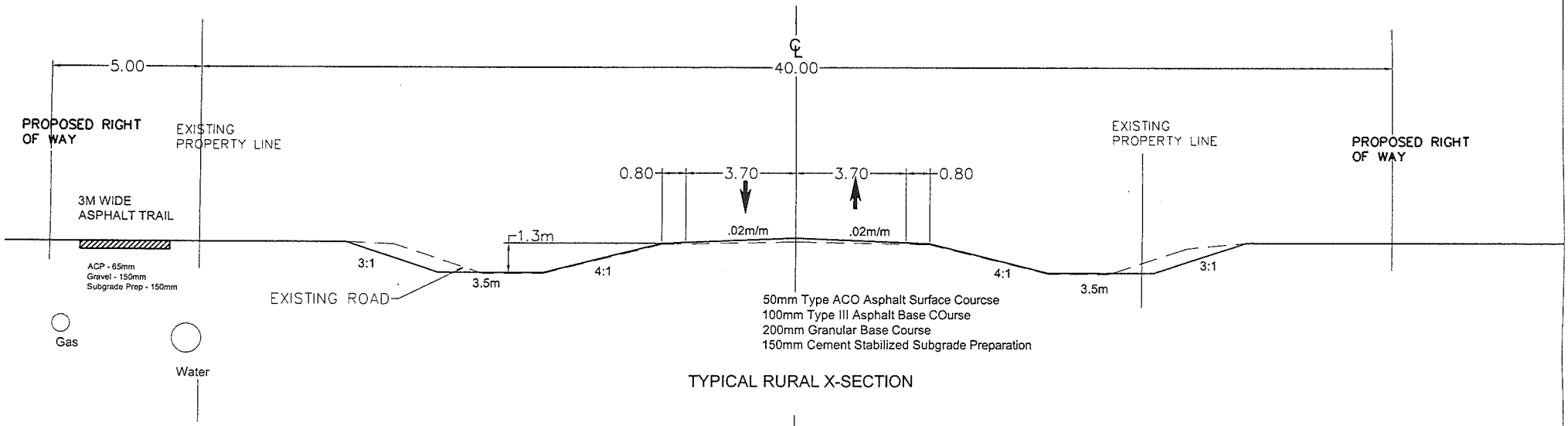
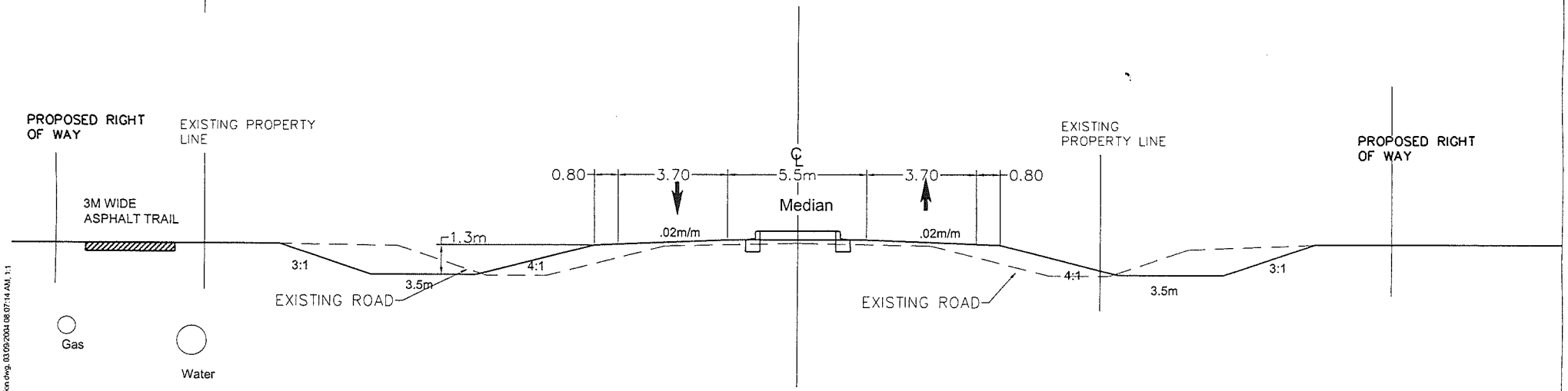


TYPICAL RURAL X-SECTION



TYPICAL RURAL X-SECTION
NEAR INTERSECTIONS

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EXHIBIT 4.2

TYPICAL RURAL CROSS-SECTIONS

Strathcona County

EARTH TECH	SCALE N.T.S.	DRAWN BY D.A.
	FILE 57257	DATE DECEMBER 2003

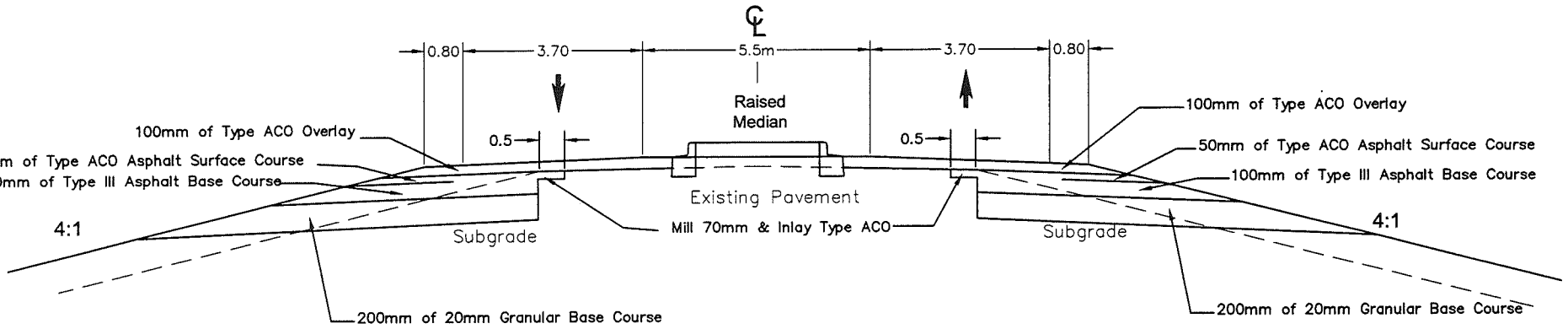

EXHIBIT 4.3

TYPICAL WIDENING DETAILS		Strathcona County
EARTH TECH	SCALE N.T.S.	DRAWN BY D.A.
	FILE 57257	DATE DECEMBER 2003

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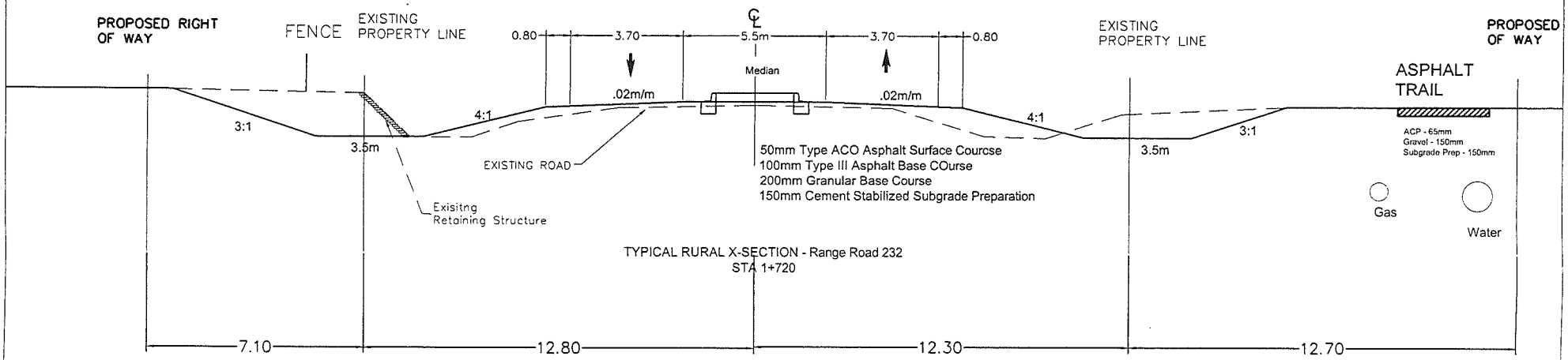

TYPICAL RURAL X-SECTION - Range Road 232
STA 1+720

EXHIBIT 4.4

WIDENING DETAILS
Range Road 232
Sta 1+720

Strathcona County

EARTH TECH	SCALE N.T.S.	DRAWN BY
	FILE 57257	DATE DECEMBER 2003

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A typical trail will be 3m wide constructed of 65mm Asphalt Surface Course and 150mm Gravel layer.

4.3 DESIGN CRITERIA

Table 4.1 lists the existing and proposed design criteria.

Table 4.1: Existing and Proposed Design Criteria - Range Roads 231/232/233

	Existing	**Proposed**
Design Designation	County Class I	County Class I
Design Vehicle	WB-21	WB-21
Design Speed	90 km/hr	80 km/hr
Vertical Grades Desirable/Maximum	6%	1.54% to 4.42% RR
Lane Width	3.5m	3.7m main 3.5m auxiliary
Shoulder Width	1.0m	0.8m both sides
Safe Stopping Sight Distance	SSD 170m	SSD 140m
Finished Pavement Width	9.0m	9.0m
Multi-use Trail	N/A	3.0m Range Road 231 on East Side Range Road 232 on East Side Range Road 233 on West side
Side Slope Ratio	3:1	4:1
Backslope Ratio	3:1	3:1
Taper Ratee	25:1	25:1 for Rural Auxiliary Lanes
Basic Right of Way	30.1m to 43.9m	40m for Range Roads, and 5m for Multiuse trail. **Total 45m**
Intersection Sight Distance	3+ seconds at design speed	3+ seconds at design speed

4.4 DEVELOPMENT OF ALTERNATIVES

Using the results of the traffic analysis and existing safety issues and public inputs, several conceptual single-line transportation network alternatives were developed to

illustrate existing and future transportation and development plans. Following issues were dealt in these alternatives:

4.4.1 Intersection Improvements

Subdivision Entrances

A review of existing and future traffic conditions on Range Roads 231, 232, and 233 indicates that wholesale widening of the roadways is not needed in the next 15 years. In order to accommodate expected growth and to address safety concerns, it is proposed that intersections along these range roads be improved through the addition of left turning lanes at existing and future subdivision entrances. Two intersection design alternatives have been generated for consideration; one with raised median and another painted median. These alternatives are shown in Exhibit 4.5. Some of the advantages and disadvantages of these alternatives are listed below:

Table 4.2 – Comparison of Raised versus Painted Median

	Raised Median	Painted Median
Advantages	1. Improved intersection capacity 2. Improved intersection delineation 3. Improved traffic guidance	1. Improved intersection capacity 2. Less construction cost 3. No problem of snow drifting and less cost to maintain
Disadvantages	1. Costlier to construct than painted median 2. More right of way required 3. Snow drifting problem during winter and costlier to maintain	1. Minimal traffic guidance 2. Minimal intersection delineation

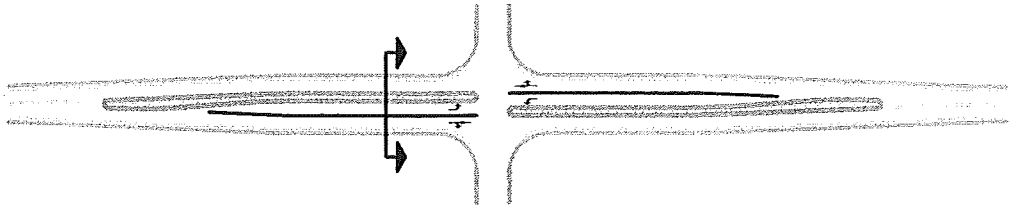
Range Road 231 at Sconadale Road/Windsor Drive

Due to the gradeline of Range Road 231 south of this intersection, there are concerns about visibility and safety at this intersection. To address the concerns, a proposed intersection improvement, unique to this location, has been generated for consideration. This is illustrated in Appendix H, Drawing 231 Sheet 04.

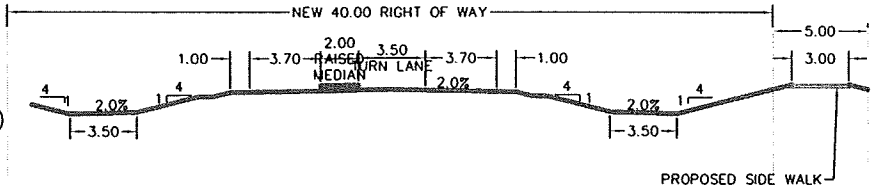
Range Road 233 at Ordze Avenue

The intersection of Range Road 233 and Ordze Avenue is experiencing problems at present, and is expected to do so in future as a result of its proximity to Wye Road,

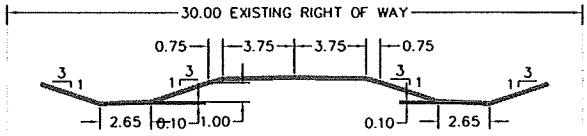
ALTERNATIVE 1 RAISED MEDIAN INTERSECTION



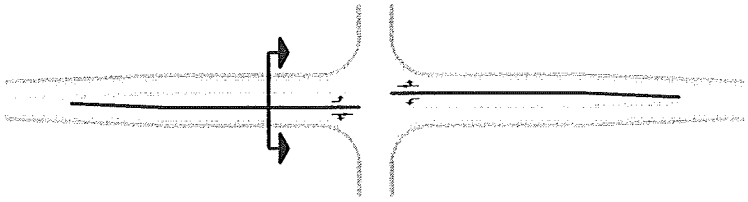
PROPOSED CROSS SECTION AT INTERSECTIONS (MEDIAN)



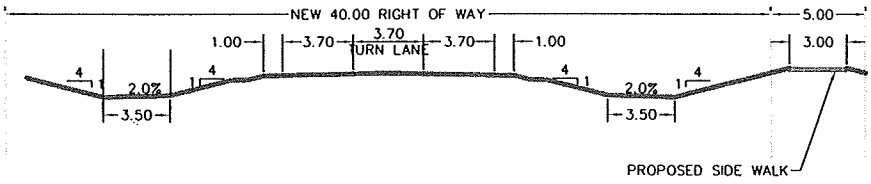
TYPICAL EXISTING CROSS SECTION



ALTERNATIVE 2 PAINTED MEDIAN INTERSECTION



PROPOSED CROSS SECTION AT INTERSECTIONS (PAINT)



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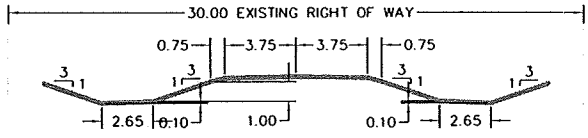


EXHIBIT 4.5

INTERSECTION DESIGN ALTERNATIVES		Strathcona County
EARTH TECH	SCALE N.T.S.	DRAWN BY D.A.
	FILE 57257	DATE DECEMBER 2002

and the extensive commercial development that exists around this intersection. In order to alleviate problems at this location, three alternatives have been developed for consideration. One of the three alternatives would continue to accommodate all movements at the intersection, while the other two alternatives would impose restrictions on certain movements.

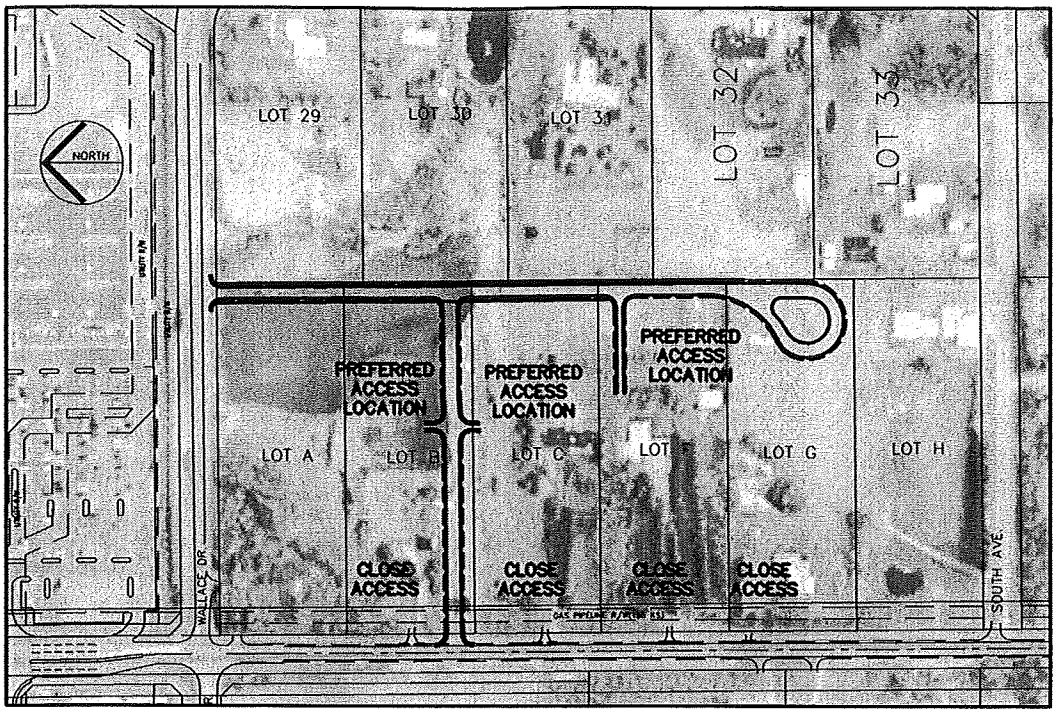
4.4.2 Access Changes

There are numerous driveway accesses onto the range roads. The number, locations and spacing of these driveways need to be optimized in the interest of improved safety and operational efficiency of the range roads. Consequently, a number of driveway accesses are proposed to be changed either by relocating or closing them wherever possible.

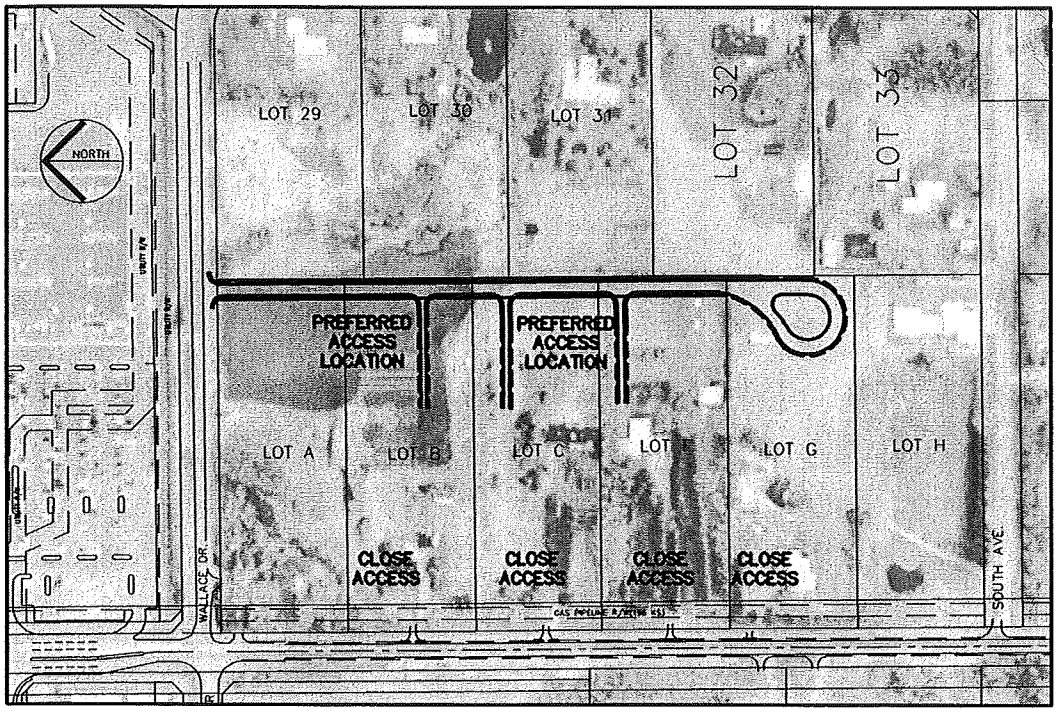
On Range Road 233, between Wallace Drive and South Avenue, two alternatives for reducing the number of direct driveway accesses onto the range road were developed for presentation at the Open Houses. It is shown in Exhibit 4.6. Alternative 1 consists of two accesses; one access from Range Road 233 and another from Wallace Drive. Alternative 2 consists of a single access point from Wallace Drive. Alternative 2 will require less land and is more effective way of providing access to individual lots. Feedback from residents indicated a preference for Alternative 2 over Alternative 1, with reservations with issues such as:

- Because houses face Range Road 233, orientation of house is not conducive with rear access road.
- Construction of Alternative 1 or 2 would require significant alteration of existing topography. In the case of Lot G, a pond exists just east of the residence. Bringing access from the rear of the property would require filling in the pond.

Subsequent to the final Public Open House, Alternative 3 was developed in response to concerns from the effected landowners. Alternative 3 is illustrated in Exhibit 4.7. It consists of a service road parallel to Range Road 233. The final access Alternative implication will be largely dependent on the outcome of land acquisition negotiations with the effected landowners.



ALTERNATIVE 1



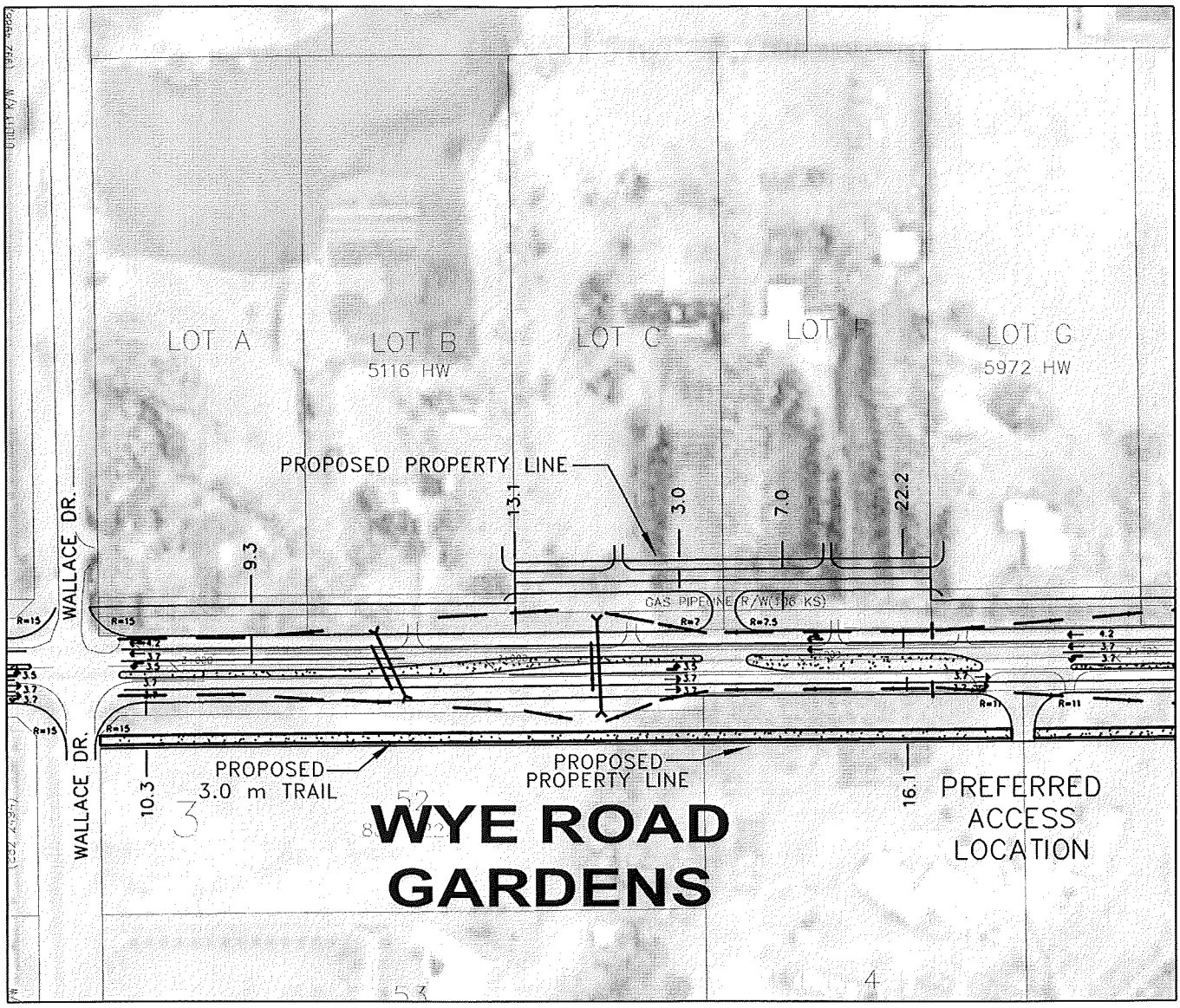
ALTERNATIVE 2

EXHIBIT 4.6

ACCESS CHANGES ON RR 233
(NEAR CAMBELLTOWN HEIGHTS)

Strathcona County

EARTH TECH	SCALE N.T.S	DRAWN BY D.A.
	FILE 57257	DATE JANUARY 2004



ALTERNATIVE 3

EXHIBIT 4.7

ACCESS CHANGES ON RANGE ROAD 233 (NEAR CAMPBELLTOWN HEIGHTS)		Strathcona County
EARTH TECH	SCALE N.T.S.	DRAWN BY W.L.
	FILE 57257	DATE DECEMBER 2002

4.4.3 Posted and Operating Speeds

Feedback from residents and road users indicates that speeding is a problem along all three Range Roads, which are currently posted at 80 km/hr. This is corroborated through speed surveys conducted by Strathcona County. As mentioned in the previous section, 40 to 60 percent of traffic travels beyond posted speed. In addition to the intersection and access changes discussed above, several alternatives with respect to the posted speed are under consideration. These range from leaving the speed as is, increasing speed enforcement, or lowering the speed limit to 70 km/hr or 60 km/hr.

4.4.4 Pedestrian Circulation

The absence of sidewalks, the presence of narrow shoulders and the high travel speed on the three range roads have generated concerns that pedestrians and cyclists are not properly accommodated at the present time. In response to these concerns, sidewalks are developed along one side of each of the range roads. However, in order to accommodate such sidewalks, it will be necessary to acquire land from adjacent property owners.

4.4.5 Road Safety Audit on Preliminary Design

Comments on the existing roadways and intersections by Road Safety Audit were taken into account in developing the preliminary functional design. A second road safety audit was carried on the preliminary functional design of roadwork. The comments and suggestions from this audit are summarised in the following section. These comments and suggestions were incorporated into the final function design.

Range Road 231

- Southbound left lane appears to merge into right lane. Consider so that the right lane merges with the left lane.
- Scondale/Windsor Dr. Intersection. Consider flattening the vertical curve to increase turning sight distance for the side street traffic. This needs to be addressed during detail design.
- Access Frequency – consider providing median refuge width or left turn slot for all access.

Range Road 232

- Private Access at Sta 3+130 – Consider providing Two Way Left Turn lanes for 100m or alternately consider providing a protected left turn area out of the private drive westbound to southbound. If WBL volumes are considerably less, restriction of this access to left in/right in/right out may be reasonable.
- If raised medians are implemented, consider providing offset, asymmetric terminuses for oncoming traffic. This will provide a small flare for on-coming traffic which will help to minimize the consequences of collision with the raised median.
- Consider using raised medians at Estate Drive to allow left turn drivers to see around opposing left turn vehicles.
- Consider using painted medians at Central Drives north and south near Yorkley.
- Consider using lane widths 3.5m and 1.3m shoulder to discourage speeding.

Range Road 233

- Ordze Road Intersection – Synchronization of the signals and queue overflow induction loops be implemented.
- Wye Road to South Avenue – Consider moving northbound diverge north of South Avenue. Options include bringing on the northbound lane for right turning movements westbound to northbound. This will reduce conflict between right turners headed northbound to eastbound at South avenue. Consider providing narrower median (approximately 1.0m)
- Access Roads between Wallace Drive and South Avenue - Consider alternative that provides access from Wallace drive. This will reduce the potential for rear end and turning movement conflicts.
- Consider adding auxiliary lanes "post" intersection rather than "pre" intersections. This reduces the conflicts between right turn traffic destined for near intersection and through or left-merge traffic heading straight ahead.

4.4.6 Traffic Noise Calculations

The purpose of this is to predict the sound levels due to future traffic on Range Road and Township Road at various residential areas and identify the locations where sound level exceeds the Strathcona County Design Noise Level (DNL) of 65 dBA $Leq_{(24\ hr)}$. As per the County's Noise Policy, retrofit noise attenuation for residential neighborhoods will be

provided only when the sound level measured at 5 metres from the rear of the dwelling exceeds 65dBA. A copy of County's Noise Policy is included in the Appendix E.

Sound levels were calculated using Traffic Noise Prediction Model (STAMSON 3.1) provided by Strathcona County. This model calculates sound level for 1 hour period only. The following equation is used by the County to convert the peak hour sound level, $Leq_{(peak\ hour)}$ to $Leq_{(24\ hr)}$.

$$Leq_{(24hr)} = 0.85\ Leq_{(peak\ hour)} + 6 \quad dBA$$

$Leq_{(peak\ hour)}$: Equivalent sound pressure level - the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.

$Leq_{(24hr)}$: The equivalent continuous noise level during a 24 hour period, usually from midnight to midnight.

Following assumptions are made in the analysis:

- The road level and yard level are assumed at same level.
- 5% percentage of total traffic volume is taken as heavy truck volume.
- Pavement type – Asphalt Pavement
- Vehicles were modelled travelling at 80 km/hr.
- Receiver location is taken 5m away from the building and 1.5m above ground level.
- Peak hour traffic volume is estimated using 2001 and 2016 AADT traffic volumes and used in the model.

Analysis was carried out for the existing traffic volume and future predicted traffic volume.

Sound Level Predictions

Location of receivers were determined from the plan and selected to represent nearest house from the road centre line. The calculated sound levels are all lower than threshold noise level of 65 dBA for both the years 2001 and 2016. Hence, noise attenuation is not warranted . The higher sound levels are noted at locations where the receiver is nearer to the road and towards Wye Road where traffic volumes are higher. A summary of calculated sound level is given in Table 4.4 below. A detail calculation of sound levels is given in Appendix E.

Range Road 231:

The calculated sound levels $Leq_{24hours}$ for the year 2001 are less than 65dBA and varied from 48.8 dBA to 54.8 dBA. The future sound level s at the same locations varied from 51.4 dBA to 56.5 dBA.

Range Road 232:

$Leq_{24hours}$ varied from 52.8 dBA to 57.3 dBA for the year 2001. The calculated sound level for the year 2016 varied between 54.4 dBA to 61.3 dBA. All the calculated sound levels are less than 65dBA.

Range Road 233:

$Leq_{24hours}$ varied between 52.2 dBA and 58.2 dBA for the year 2001 and for the year 2016 it varied from 53.6 dBA to 59.8 dBA.

Table 4.4 Summary of Sound Level

Road/Station	2001 Traffic Volume (AADT)	2016Traffic Volume (AADT)	Offset (m)	Side	2001 Sound Level, $Leq_{(24Hr)}$ dBA	2016 Sound Level, $Leq_{(24Hr)}$ dBA
Range Road 231						
2620	7100	11200	56	E	54.8	56.5
1900	3600	7400	37	W	54.9	57.5
1520	3600	7400	51	W	52.9	55.6
1200	3600	7400	51	W	52.9	55.6
920	3300	6800	55	W	52.2	54.8
650	3300	6800	95	E	48.8	51.4
Range Road 232						
3090	7900	19400	40	E	57.3	60.6
3020	7900	19400	46	E	56.4	59.7
2650	7900	19400	46	E	56.4	59.7
2220	7900	19400	35	E	58.1	61.3
2030	4100	6200	28	W	57.1	58.5
1920	4100	6200	35	E	55.7	57.1
1650	4100	6200	45	E	54.2	55.6
1550	4100	6200	71	W	51.4	52.8
1200	4100	6200	43	W	54.5	55.9
950	3700	5600	25	W	57.3	58.9
600	3700	5600	52	W	52.8	54.4
350	3700	5600	46	E	53.6	55.1
150	3700	5600	50	W	53.1	54.6
Range Road 233						
2925	6400	9700	40	E	56.5	58.0
2800	6400	9700	95	E	51.1	52.8
2750	6400	9700	60	W	53.9	55.6
2725	6400	9700	30	E	58.2	59.8
2550	6400	9700	42	E	56.2	57.8
2320	6400	9700	55	W	54.5	56.1
1900	5300	8000	80	W	51.6	53.0
1750	5300	8000	70	W	52.3	53.9
1400	5300	8000	54	E	53.9	55.5
620	4800	7200	50	E	54.0	55.6
620	4800	7200	68	W	52.2	53.6
600	4800	7200	68	W	52.2	53.6
230	4800	7250	65	E	52.4	53.9

4.4.7 Intersection Illumination

An intersection illumination warrant analysis was carried out using TAC spreadsheet "Illumination of Isolation Rural Intersections", February 2001. 2001 traffic volume were used along the Range Roads. The side road traffic volumes were generated by applying

trip generation rate of 10 trips per day to the number of dwelling units served by the side road. This trip rates are slightly higher than ITE trip generation rate as the trip rate (9.57 trips/dwelling unit) is anticipated higher in these areas for detached house.

Following table shows the TAC warrant for illumination of isolated rural intersections:

Type of Intersection	Total Score Point	Type of Illumination Warrant
Signalized	N/A	Illumination Always Warranted
Unsignalized	> 240	Full Illumination
	< 240 but > 120	Partial or Delineation Lighting
	< 120	Generally Illumination not Warranted

Warrant analysis result showed some of the intersection warrants for illumination. Further site and collision review need to be done to determine the type of illumination required. The warrant score suggests, it will be either Delineation or Partial Lighting type. Summary of illumination warrant score and need of illumination is given in the following table and presented in Appendix F.

Table 4.5 Summary of Illumination Warrant

Road	Intersecting Road	Short Term	
		Warrant Score	Illumination
RR 231			
	Thomson Road	111	Not Warranted
	Thomson Ave.	98	Not Warranted
	Windsor Dr.	101	Not Warranted
	Windsor/Scondale	107	Not Warranted
	Deer Mountain	**121**	**Warranted**
RR232			
	Private Road	108	Not Warranted
	Estate Dr.	**151**	**Warranted**
	Central Dr.	108	Not Warranted
	Yorkley Dr.	98	Not Warranted
	Yorkley/Central	98	Not Warranted
	Scott haven/Edward	101	Not Warranted
	Scott haven/Edson	101	Not Warranted
	Winfield	101	Not Warranted
	Cranbery	101	Not Warranted
	Winfield Rd	101	Not Warranted
RR233			
	Wal-Mart/Ordze Rd.	**191**	**Warranted**
	Wallace Dr.	111	Not Warranted
	South Ave.	108	Not Warranted
	Fountain Creed Rd	**151**	**Warranted**
	Fountain Creek Way	**151**	**Warranted**
	Fountain Creek Blvd	**131**	**Warranted**
	Chrenek Dr.	98	Not Warranted
	Aspen Dr.	101	Not Warranted

Other road safety counter measures may improve nighttime driving environment, which can be highly reflective delineation, transverse rumble strips, and signs.

5 STORMWATER MANAGEMENT

5.1 GENERAL

Following a detailed review of traffic volumes and site conditions it has been recommended that the only road improvements that are required within the planning horizon to 2016 are development of protected left turn bays at the intersections, the four laning of Range Road 233 south from where it currently has the 4 lane urban section, south to South Avenue before tapering back into the rural road section. Relative to the overall site area, the intersection improvements will result in a very minor change in the runoff volumes. Attached is Exhibit 5.1 showing the existing Fulton Creek and Gold Bar Creek drainage basins.

Range Road 233 drainage is split into the Gold Bar Creek Basin and the Fulton Creek Basin with the high point dividing the basins occurring roughly 1.5 miles south of Wye Road, at the south side of the Chrenek Estates development.

Range Road 232 is also split between the Gold Bar Creek and Fulton Creek Basins with the high point occurring 1.3 miles south of Wye Road, running through the Scot Haven development on the west side of the Range Road. North of the high point Range Road 232 forms the eastern limit of the Gold Bar Creek Basin.

On Range Road 231 the high point for drainage occurs just north of Highway 628, so only a small portion of the road drains into the Fulton Creek Basin.

The Gold Bar Creek Flood Risk Study was commissioned by the City of Edmonton and a draft report prepared by Associated Engineering was produced in April 2000. The Gold Bar Creek basin encompasses an area of 25 sq. km of which approximately half the area is in Strathcona County. Exhibit 5.2 shows the boundaries of the Gold Bar Creek basin in the area of the Range Roads covered under this study. The land use is predominantly residential on the east side of Highway 14 and industrial on the west side of the Highway. A number of storm ponds have been developed in the basin but the creek is small, overgrown and poorly defined in many places. The analysis indicated the creek system is substantially overloaded at present. Culvert capacities were noted as a critical constraint, having only capacity for predevelopment flows, but not the peak flows that presently occur. The existing ponds were only designed for up to a 25 year storm event. It was proposed that flows be controlled to a runoff rated of 3.0 l/s per hectare. No improvements were noted as required within the bounds of the catchment area adjacent the roadways under study.

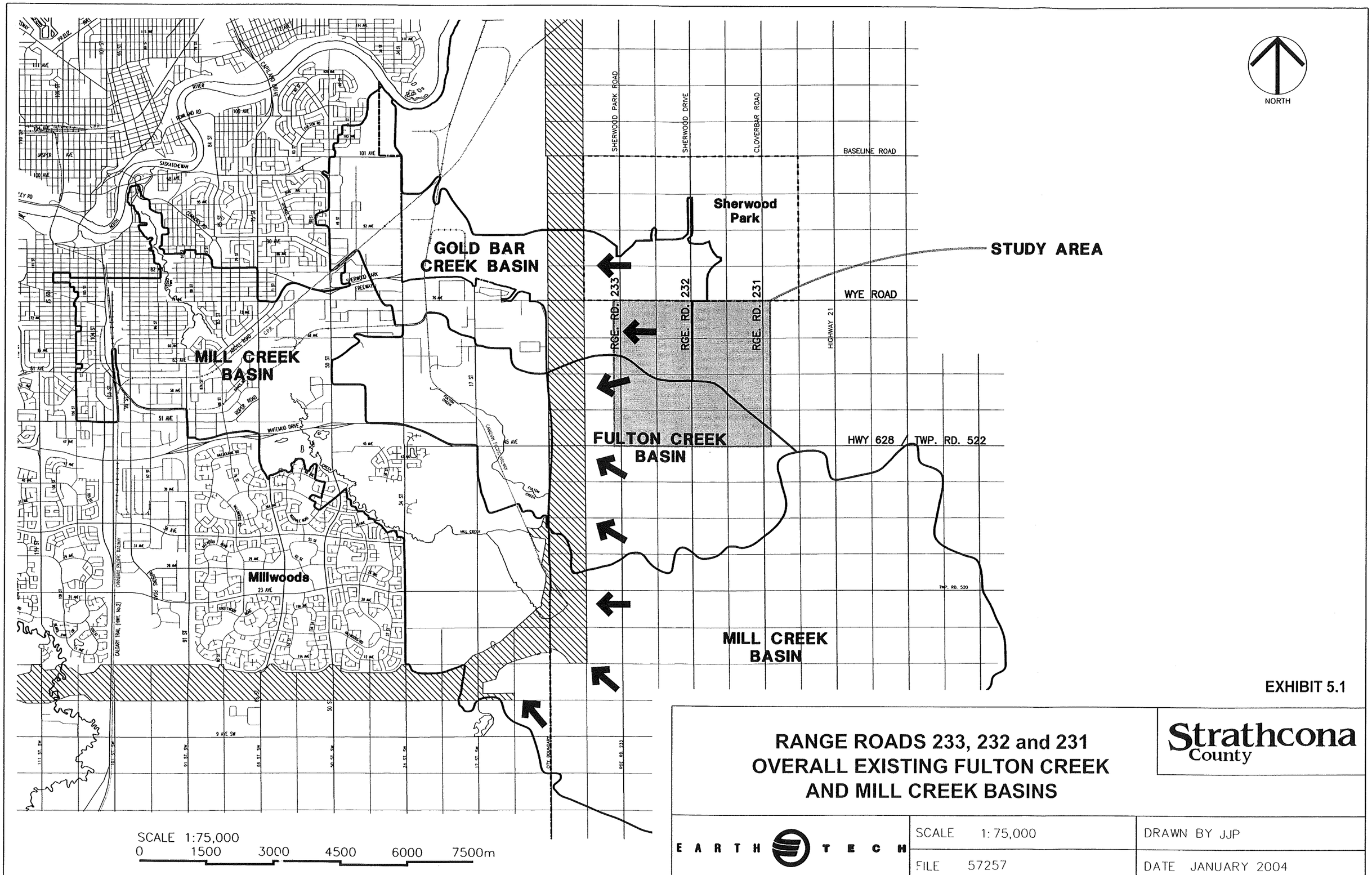


EXHIBIT 5.1

RANGE ROADS 233, 232 and 231 OVERALL EXISTING FULTON CREEK AND MILL CREEK BASINS

Strathcona County

EARTH TECH	SCALE 1:75,000	DRAWN BY JJP
	FILE 57257	DATE JANUARY 2004

The road study area noted above along Range Road 233 and Range Road 232 are in the extreme southeast portion of the Gold Bar Creek basin, and surface runoff is collected along the roads into 2 subcatchment areas. Drainage west of Range Road 232 from Scot Haven, Whitecroft (West), Whitecroft (East), Sherwood Golf Estates (pending residential), Campbell Town Heights and Wye Road Gardens flows in a northwesterly direction to the Wye Road Gardens pond before crossing under Wye Road. The 370.3 ha area was assigned a CN of 75 and had a peak flow of 2.4 m3/sec and runoff depth of 81mm. The analysis indicated that the Wye Garden pond would overtop during a 100 year event 4 day storm. Chrenek Estates storm drainage flows across Range Road 233 to the west and collects to a pond on the east side of Highway 14 before crossing under the highway in a culvert.

The City of Edmonton Commissioned the Mill Creek and Fulton Creek Flood Study and Associated Engineering provided a report on this in November 1999. The analysis showed that at present the flooding is generally localized and occurs primarily in the agricultural areas of the basin. The report recommendations included controlling flows to a maximum of 3 l/s per hectare. Approximately 60% of the Mill Creek/ Fulton Creek basin lies in the Strathcona County. This land is predominantly agricultural and country residential, with rolling ground moraine and a large number of sloughs, wetlands, and enclosed depressions. The area is poorly drained resulting in substantial storm flow attenuation.

The southern portions of Range Road 233, 232, and 231 flow into 3 subcatchment areas of the Fulton Creek Basin. Exhibit 5.3 shows the boundaries of the Fulton Creek basin in the area of the Range Roads covered under this study. South Chrenek Acres, Chrenek Estates and lands to the west of Range Road 233 and north of Highway 628 flow to the west crossing Highway 14 in a 914mm culvert, where flows go from the north side of Highway 628 to the south side of 45th Ave. The drainage area is 431.7 ha and was assigned a CN of 70. The area west side of Range Road 232 including the south portion of Scot Haven and Winfield Heights flows south across Highway 628 to a large pond before flowing west. The third subcatchment area between Range Road 232 and Range Road 231 that drains portions of the Graham Heights and Windston Estates developments as well as Carriage Lane and Deer Mountain drains south across Highway 628 and also drain southwest to the large pond before flowing west and crossing Highway 14 in a 1375mm culvert. This area is 488.5 ha in size and was assigned a CN of 70.

The 1999 study was based on the assumption that the future conditions will remain the same as the existing runoff conditions in the area of this road study.

The conveyance system must be considered. The document "Storm Water Management Guidelines for the Province of Alberta" produced by Alberta Environment, while discussing the effectiveness of grassed swales in handling water quantity states: "Grassed swales infiltrate storm water and reduce end of pipe discharge volumes. Significant amounts (up to 95%) of runoff reduction are reported in the literature pertaining to grassed swales." When discussing water quality the document states: "Grassed swales can be effective in filtering and detaining storm water from a variety of catchment types. Grassed swales are effective for storm water treatment as long as minimum channel slope is maintained and a wide bottom width is provided. Many storm water contaminant particulates are effectively filtered by grassed swales including heavy metal, COD, nitrate nitrogen, ammonia nitrogen, and suspended solids."

The soils in this area are well suited to allow infiltration, however it is difficult to predict how effectively the swales will treat storm water and allow infiltration.

5.2 MINOR DRAINAGE SYSTEM (PIPED)

With the exception of the area immediately adjacent to Wye Road and the area west of Wallace Road, there is no piped storm drainage system.

The following describes the storm drainage system at the west end of Wallace Drive. Storm water flows from Ordze Avenue are conveyed in an existing 750mm line storm line to the corner of Wallace Drive 200m west of Range Road 233. Ditch flows discharging at the corner Wallace Drive as well as the Ordze Avenue storm flows are routed to the west to a storm pond through a 1050mm storm line.

Minor storm events up to the 1 in 5 year storm are handled with rural ditches and culverts at roadway crossings. Fountain Creek Estates has a storm collection system, which collects to a storm pond in the northwest corner of the development and then discharges to the north away from Range Road 233.

5.3 MAJOR DRAINAGE SYSTEM (OVERLAND)

Each of the roadways in the study area has been developed to a rural standard utilizing grassed ditches with culverts to cross any intersecting roadways. These facilities provide the major drainage system for the area. Because of the grassed ditches and the lower density development the runoff coefficients are low and there is little accumulation of runoff. During longer duration heavy rainfalls water flows to natural low points and drainage channels along the roadways.

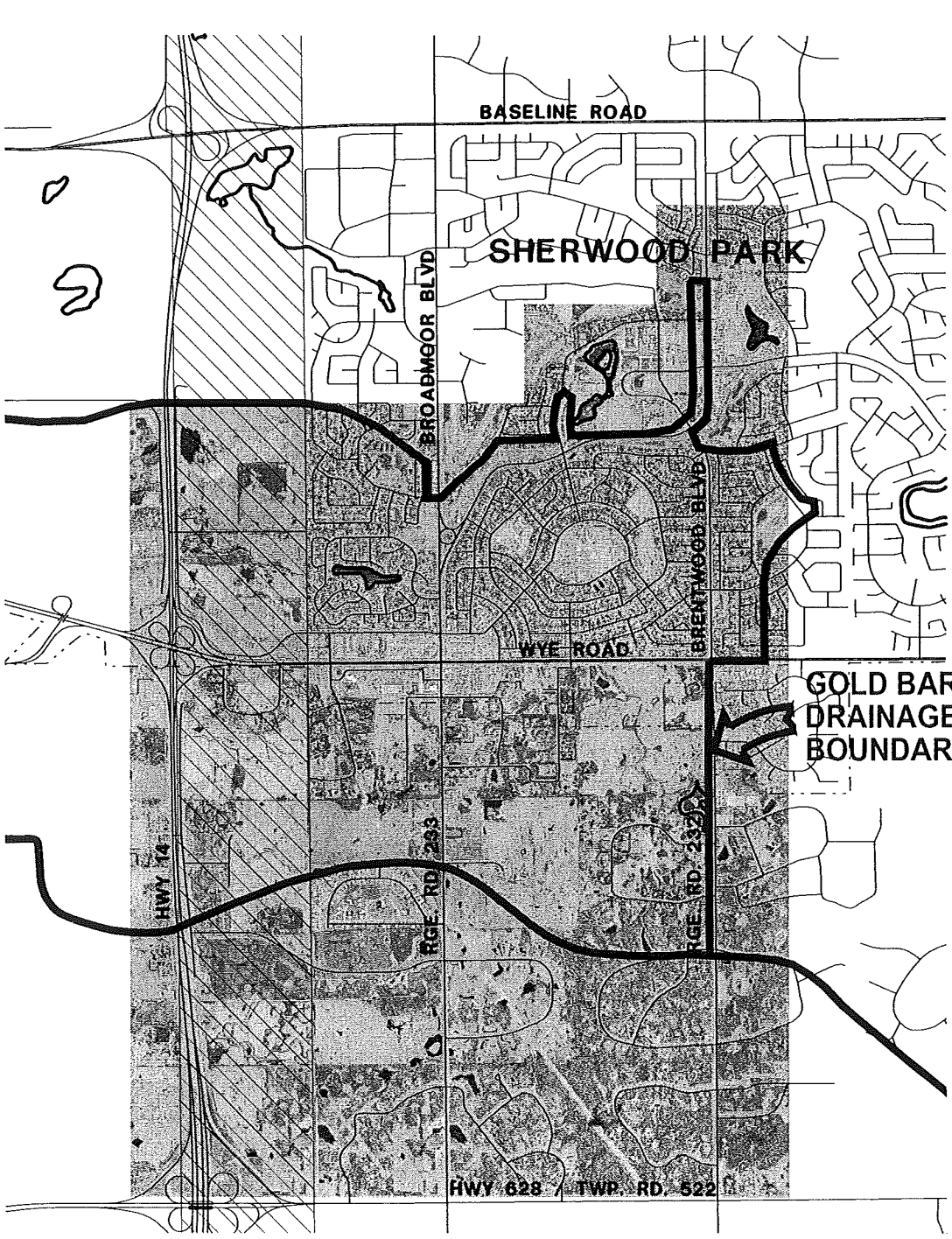
For the purpose of storm water runoff analysis, the 45m road right of way was considered. This width includes asphalt roadway, grass ditches, proposed intersection improvements and proposed asphalt trails. The proposed improvements will give the area a slightly higher imperviousness, but over longer stretches of roadway will not amount to much of an increase. The proposed storm water runoff has been compared to the existing flows with results representative of the difference in existing vs. proposed runoff and are shown in percentage form. However, various other elements need to be considered, the number of storm ponds, creeks or natural watershed areas, which pick up roadway runoff for the Gold Bar Creek Basin, the Fulton Creek Basin. Range Road 233 has storm ponds or natural watersheds close to the roadway, which accept runoff at five different locations along Range Road 233. With the proposed improvements including six intersections and 3 km of trail along Range Road 233 the increased percentage of runoff is 23%. The percentage into the Gold Bar Creek Basin area is 27%, while the increase to the south or Fulton Creek Basin is 17%. Exhibits 5.2 and 5.3 show the boundaries of the storm drainage basins relative to the study area.

The north section of Range Road 232 has four outlet locations to four natural watershed/storm ponds. There are five proposed intersection improvements and 1.9km of trail. Within the road right-of-way there is a 20% increase in runoff. The southern portion of the Range Road, which is part of the Fulton Creek Basin, includes 2 outlet points. There are 3 proposed intersections with 1.3 km of proposed trail. The increase in runoff is 15%.

Range Road 231 splits into three sections. The northern 350m drains into the Wye Road ditch system. It has one proposed intersection improvement and 350m of trail giving a roadway runoff increase of 18%. The next catchment area to the south includes 1.6km of roadway which drains into the storm pond just north of Executive Estates. There are 4 proposed intersection improvements and 1.9 km of proposed trail, giving the runoff increase for the roadway is 14%. The remaining 900m of RR231 drains south into the Highway 628 ditch system. With one proposed intersection improvement and 900m of trail, the road runoff is only increased by 10%.

5.4 DESIGN

For the intersection improvements a number of roadway cross sections have been considered. Each will incorporate the use of culverts to allow storm water to follow its normal route unimpeded.



SCALE 1:40,000

0 800 1600 2400 3200 4000m

EXHIBIT 5.2

GOLD BAR CREEK BASIN

Strathcona County

EARTH TECH	SCALE 1:40,000	DRAWN BY GSF
	FILE 57257	DATE JANUARY 2004

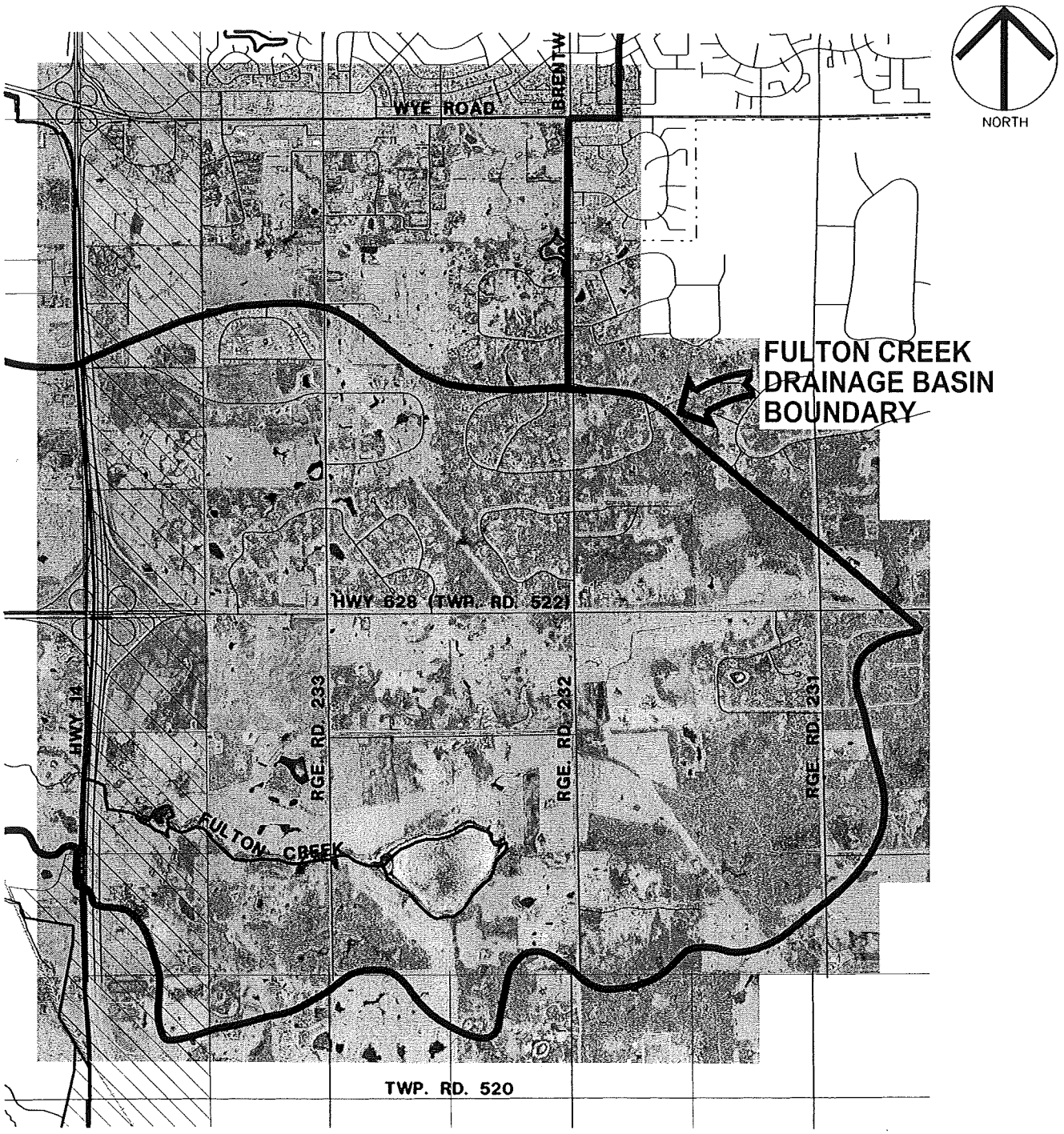


EXHIBIT 5.3

FULTON CREEK BASIN

Strathcona County

EARTH TECH	SCALE 1:40,000	DRAWN BY GSF
	FILE 57257	DATE JANUARY 2004

Ditch Design Criteria

Level of Service - Ditch and culvert system designed to convey the 1:5 year storm flow with surcharging for the 1:100 year flow but not resulting in complete inundation of the roadway at the culvert crossings.

Ditch Cross- Section – Minimum ditch bottom width of 3.5m with side slopes along roadways as noted in the County's Rural Standards Guide.

Ditch Grades – Minimum of 0.5% preferred with an absolute minimum of 0.1%. Maximum grade should be based on a maximum velocity of 1.5m/s for grass-lined channels. Higher velocities will require erosion protection.

Culvert Design – Minimum pipe size for driveway crossings will be 400mm and for roadway crossings the culvert shall be a minimum of 600mm. Driveway culverts are to be designed for a minor flow, with the major flow allowed to overtop the driveway. Major road crossings to be designed for major flow of 1:100 year.

Range Road 233 Piped System for 4 Lane Urban Roadway

Prior to designing a piped storm water collection system that would service an urban 4 lane roadway on Range Road 233, it will be necessary to evaluate the capacity of the existing 1050mm pipe extending west from Wallace Drive, as well as the existing dry pond the line drains to.

The existing 1050mm storm line at the corner of Wallace Drive has an invert elevation of 719.44 and a rim elevation on the berm of 723.62. The ditch inlet invert at Wallace Drive is set at 721.46, which is a full 2 meters higher than the manhole invert which will allow sufficient cover for the installation of a piped storm system to service Range Road 233 from Wallace Drive south to Fountain Creek Estates.

There is over 8m of elevation drop between the road at Range Road 233/Wallace Drive and the invert of the storm line at Wallace Drive 200m to the west there will be no problem to convey water from a pipe system on Range Road 233 to the west and into the storm line.

The existing ditches on Wallace Drive going to the east from the 90 degree corner on Wallace Road toward Range Road 233 have a good grade with the deeper north ditch set at 2.5% and the south ditch graded at 3.0%. The ditch bottom at the northwest corner of Wallace Drive and Range Road 233 is at 726.44m and the southwest corner is at

726.62m, which is 1.1 to 1.4m lower than the road shoulder in this location, which is 727.73m.

There are 3 culvert crossing on Range Road 233 between Wallace Drive and South Ave. Going south from Wallace drive the culverts are located roughly 90m (Inv 725.66), 168m (Inv 725.12), and 385m (Inv 727.07) south of the center line of Wallace drive on the 415m run south to South Ave. The middle culvert discharges to a natural drainage course that flows through lots 52, 53, and 54 of Plan 882 2222 to the ditch inlet at the corner of Wallace Drive next to the start of the existing pipe storm line described previously. It would be desirable to maintain the flows in this existing drainage course rather than collecting it into a new roadway storm sewer pipe. If necessary these culverts could be tied into the storm line if the 200m of storm line on Wallace was installed at a 2% grade from the existing 1050mm line invert, and a storm line on Range Road 233 between Wallace Drive and South Avenue was set at 0.5%. The road elevation at South Avenue is around 729.6m and the storm line with the grades noted would have an invert of approximately 725m.

Range Road 233 rises at a grade of 1.07% from South Avenue to the gas line right of way adjacent Fountain Creek and Range Road 233 crests 1.66 km south of South Avenue. It would be physically possible to extend the storm sewer to collect rainfall south to the road crest however there would likely be issues with downstream pipe and pond capacity. At present there is a natural pond to the west of South Avenue that captures much of the drainage that flows in the west ditch along Range Road 233 and it would be desirable to continue to route drainage to these ponds to attenuate flows and enhance water quality.

The Balmoral Heights development is currently being proposed for lands west of Range Road 233 and to the north of the Fountain Creek Development. This development will have a storm water management pond for attenuation of flows and water quality treatment. It is not anticipated that flows from Range Road 233 would be accommodated in a new storm water pond constructed on private lands.

6 UTILITIES

6.1 STORM DRAINAGE

Except for local piped storm drainage systems in the area of Wye road, and a local system to service the Fountain Creek Estates on Range Road 233 there are no underground piped storm drainage systems in the study area. The piped system servicing Fountain Creek does not follow the Range Road 233 road right of way.

6.2 WATER

A 150 mm water main is located on Range Road 231 from Wye Road south to Highway 628, and it operates as a trickle system to fill holding tanks at each residence served.

There is no piped water existing or planned along Range Road 232.

Fountain Creek Estates obtains its water supply through a 300mm line coming into the subdivision from the north along Ordze Crescent and Fountain Creek Road. A 200mm watermain was stubbed out to Range Road 233 on Fountain Creek Way for future looping of the system. Strathcona County is currently looking at options for the alignment of a new 250mm or 300mm watermain to develop a looped water supply. One option is to install the line on lands east of the existing Range Road 233 right of way. An option to this which has been discussed was to extend the watermain across Range Road 233 into the proposed Sherwood Golf Estates development and then loop it north through existing developed areas and tie it back into the water system in the area next to the Wal Mart. A connection out to Range Road 233 has also been contemplated to service the proposed Balmoral Heights development planned north of Fountain Creek Estates, but no details have been put forward to the County to date.

6.3 SANITARY SEWER

There are no sanitary sewer mains on Range Road 233. The service lines for Fountain Creek Estates parallels the watermain and comes in from the north along Ordze Crescent and Fountain Creek Road.

6.4 SHALLOW AND OVERHEAD UTILITIES

Pipelines

At the entrance to Fountain Creek Estates at Fountain Creek Way and Range Road 233 there are 4 pipeline Right of Way's that cross Range Road 233 in a northwest to southeast direction. They include Gulf R/W plan 4605H.W., Norcen R/W plan 2959 H.W., I.P.L. R/W plan 882-0817, and I.P.L. R/W plan 882-0817

ATCO Gas lines

There is a gas line paralleling Range Road 233 on the east side of the road right of way along Campbelltown Heights, in a separate right of way. There are small diameter gas mains running parallel to the road, typically in easements adjacent the road right of way servicing the country residential developments along range roads. The lines are typically in the range of 32mm to 50mm in size. The line locations relative to the road vary greatly and locates will be required in any areas where construction is contemplated to determine if there will be conflicts that will need to be resolved.

Power

There are overhead power lines along all of the roads in the study area. The poles are typically installed at a 0.6m offset in from property line. Range Road 231 has a 14.4 KV powerline along the east side of the roadway. Range Road 232 has a 25 KV that runs down the east side of the road from Wye Road to Whitecroft West's north entrance the offsets to the west side down to the Winfield Heights north entrance. There is a 14.4 KV power line on the east side of Range Road 232 north from Hwy 628 along the Carriage Lane subdivision. Range Road 233 has a 14.4 KV powerline that runs along the east side of the roadway from the south entrance to Campbell Town Heights to just past the entrance to Chrenek Acres. The section of line on Range Road 233 from Wye Road south along the commercial area and Campbell Town Heights is a 25 KV line.

The poles for overhead lines are typically placed at 600mm inside existing road right of ways. In locations along the range roads where property will be acquired to do roadway widenings, the power lines will need to be moved back to an offset from the new property line. The cost of the overhead line relocations is typically borne by the utility companies based on standard agreements between the municipalities and the utility companies.

Aquila upgraded a section of their single phase power line to three phase power in 2003, along Range Road 233 following the original alignment. They have agreed to relocate the line in the future at their cost if this is required to facilitate the road upgrading.

Telephone and Cable TV

Telus and Shaw Cable have a mixture of overhead and underground lines on Range Roads 231,232, and 233. They have some fiber optics lines in the area. They have indicated to Strathcona County that they are interested in putting more of their lines underground on Range Road 233, but this will not be done until the Right of Way limits have been finalized.

7 ENVIRONMENTAL AND HISTORICAL RESOURCES IMPACT ASSESSMENT

A summary of the environmental and historical resources impact assessment is presented in the following section. Detail assessment is presented in Appendix G.

7.1 EXISTING ENVIRONMENT

Soils and Landform

Dark Gray Luvisolic soil developed on clay loam textured till (Uncas) is the most common soil series along Range Roads 232 and 233. Orthic Gray Luvisolic (Cooking Lake) soil, also occurring on clay loam textured till, is also common along the southern portion of Range Road 231. Low-lying areas contain various Gleysolic and shallow Organic soils that are usually wet. Topsoil is generally rated as Fair suitability for re-vegetation because of pH with thickness varying between 10 and 25 cm. Surface horizons (Ah and Ap) are dark gray to black in color and often overly a grayish Ae horizon. Subsoil is also rated as fair suitability for re-vegetation because of texture and consistence. The soils are non-saline and non-sodic.

Vegetation

Much of the area has been altered by agricultural and residential developments. Natural vegetation along the roadways consists primarily of aspen/balsam forest, although aspen forest, willow shrubland, cattail marsh, sedge/grass meadow, and wetland complexes are also present. There is some potential for the occurrence of rare plant species in habitats adjacent to the roadways, particularly associated with wetland areas. However, rare plants have not been recorded during several road upgrading projects within Strathcona County in recent years.

Wildlife

Several mammals, including deer, moose, coyote, fox, striped skunk, least weasel, short-tailed weasel, badger, mink, pocket gopher, Richardson's ground squirrel, red squirrel, snowshoe hare, mice, voles, shrews, and bats, are known to occur in the general region. Over 80 species of birds are expected to occur in the study area, including songbirds, birds of prey, upland gamebirds, waterfowl, shorebirds, and others. The boreal chorus frog, wood frog, and tiger salamander are likely to occur in the area, as may the red-sided and plains garter snakes.

Hydrology

No watercourses cross or are adjacent to Range Roads 231, 232, and 233 within the study area. A few small drainages cross Range Road 233; however, these do not appear to be connected to any watercourse. Therefore, the study area is considered to not have any fish or fish habitat value.

Historical Resources

In the immediate Sherwood Park locality, 52 recorded archaeological sites were identified. Four sites discovered to date occur within the study area west of Range Road 233. All of these sites have been disturbed by previous development (primarily agricultural) and none are considered significant. There are no known sites adjacent to the roadways within the potential zone of impact as a result of potential road upgrading. The area, however, is considered to have moderate to high potential for archaeological sites. The Upper Cretaceous Edmonton Formation has also been known to contain dinosaur remains, although this area has been classified to have "unknown" palaeontological sensitivity to development.

7.2 ENVIRONMENTAL CONCERNS / MITIGATION

Concerns of the potential roadway upgrading project include loss of soil quality, quantity and land capability, loss of natural vegetation/wetlands, loss/alteration of wildlife habitat, wildlife mortality, disruption of wildlife movements, sensory disturbance to wildlife, and disturbance to historical resources. Recommended mitigation measures include implementation of soil handling guidelines, minimizing loss of natural habitat, compensation for lost habitat, appropriate scheduling of construction periods, and monitoring of wildlife/vehicle collisions. In addition, a rare plant and wildlife survey within natural habitats, and archaeological inspections are recommended for any finalized alignments prior to construction.

8 RECOMMENDED PLAN

8.1 RECOMMENDED PLAN

Based on the feedback received and technical considerations, the project team in consultation with Strathcona County has created a "Recommended Plan." The recommended plans for all three Range Roads are presented in Appendix H as a drawing set.

8.1.1 Range Road 231

Roadway Twinning

Based on the future traffic volume and threshold level of service "C", the twinning is required between Thomson Road and Wye Road. The extent of twinning is shown in Appendix H, Sheets 1 and 2 (Range Road 231).

Intersection Improvements - General

In order to improve traffic flow and safety along the three range roads, it is recommended that turn lanes with a raised median be implemented at all existing and future subdivision entrances and other major access points.

Access Changes

To improve traffic flow and safety on the range road, a number of access modifications are being recommended. These modifications are intended to reduce the number of accesses from individual properties and/or to re-arrange accesses to better locations.

Posted Speeds

Based on feedback from residents and road users and through speed surveys conducted by Strathcona County, the existing 80 km/hr speed limit on the three range roads will be reduced to 70 km/hr.

Right of Way Requirements

To address existing traffic concerns, and to accommodate possible future growth, it is recommended that a minimum right of way of 40m be reserved for each of the range roads and an additional 5m right of way be reserved for a multi-use trail, for a total right of way of 45m. This is in keeping with Strathcona County's current standards.

The total land required to improve the road is 4.93 Acres. The cost of land is taken as $40,000 per acre. It will cost $200,000 to acquire the land. A detail break down of the land requirement is given in Appendix I.

Pedestrian Circulation

A 3.0m wide trail is to be developed along east side of the Range Road. In order to accommodate such a trail, it will be necessary to acquire land from adjacent property owners.

Traffic Noise

The results of sound level calculation showed that the future noise levels along the road varied from 51.4 to 56.5 dBA. These values are lower than the threshold noise level of 65dBA. Hence, retrofit noise attenuation is not required during the period of 2001 and 2016.

Intersection Illumination

Analysis based on present traffic volume, partial or delineation lightings are warranted at Deer Mountain Intersection.

8.1.2 Range Road 232

Roadway Twinning

Based on the future traffic volume and threshold level of service "C", twinning is required between Estate Drive and Wye Road, about 525m. The extent of twinning is shown in Appendix H, Sheets 1 to 3 (Range Road 232).

Intersection Improvements - General

In order to improve traffic flow and safety along the three range roads, it is recommended that turn lanes with a raised median be implemented at all existing and future subdivision entrances and other major access points.

Access Changes

To improve traffic flow and safety on the three range roads, a number of access modifications are being recommended. These modifications are intended to reduce the number of accesses from individual properties and/or to re-arrange accesses to better locations.

Posted Speeds

Based on feedback from residents and road users and through speed surveys conducted by Strathcona County, the existing 80 km/hr speed limit on the three range roads will be reduced to 70 km/hr.

Right of Way Requirements

To address existing traffic concerns, and to accommodate possible future growth, it is recommended that a minimum right of way of 40m be reserved for each of the range roads and an additional 5m right of way be reserved for a multi-use trail, for a total right of way of 45m. This is in keeping with Strathcona County's current standards.

The total land required to improve the road is 10.4 Acres. The cost of land is taken as $40,000 per acre. It will cost $415,000 to acquire the land. A detail break down of the land requirement is given in Appendix I.

Pedestrian Circulation

A 3.0m wide trail is to be developed along east side of the Range Road. In order to accommodate such a trail, it will be necessary to acquire land from adjacent property owners.

Traffic Noise Calculation

The results of sound level calculation showed that the future noise levels along the road varied between 54.4 dBA to 61.3 dBA. These values are lower than the threshold noise level of 65dBA. Hence, retrofit noise attenuation is not required during the period of 2001 and 2016.

Intersection Illumination

Analysis based on present traffic volume, partial or delineation lightings are warranted at Estate Drive.

8.1.3 Range Road 233

Roadway Twinning

Based on the future traffic volume and threshold level of service "C", twinning is required between new Fountain Creek Road Avenue and Ordze Avenue. The road between Ordze Avenue and Wye Road has already four lanes. The extent of twinning is shown in Appendix H, Sheets 1 to 3 (Range Road 233).

Intersection Improvements - General

In order to improve traffic flow and safety along the three range roads, it is recommended that turn lanes with a raised median be implemented at all existing and future subdivision entrances and other major access points.

Intersection Improvements near Wal-Mart

In order to address traffic problems on Range Road 233 at Ordze Avenue, the following changes are recommended:

- Localized widening of Ordze Avenue immediately west of Range Road to create two eastbound lanes approaching Range Road 233.
- Installation of a traffic signal at Range Road 233 and Ordze Avenue to facilitate movement onto and across Range Road 233.
- Creation of a left turn lane from Wye Road into the Wal-Mart site

This work (localized widening and signal installation) was completed in 2003.

Access Changes

To improve traffic flow and safety on the three range roads, a number of access modifications are being recommended. These modifications are intended to reduce the number of accesses from individual properties and/or to re-arrange accesses to better locations.

Posted Speeds

Based on feedback from residents and road users and through speed surveys conducted by Strathcona County, the existing 80 km/hr speed limit on the three range roads will be reduced to 70 km/hr.

Right of Way Requirements

To address existing traffic concerns, and to accommodate possible future growth, it is recommended that a minimum right of way of 40m be reserved for each of the range roads and an additional 5m right of way be reserved for a multi-use trail, for a total right of way of 45m. This is in keeping with Strathcona County's current standards.

The total land required to improve the road is 10.0 Acres. The cost of land is taken as $40,000 per acre. It will cost $400,000 to acquire the land. A detail break down of the land requirement is given in Appendix I.

Acquisition of required right of way is essential for this project to proceed. Until the County acquires the necessary land, there are infinite number of alternative exists (Wallace Drive to - Lot G)

Pedestrian Circulation

A 3.0m wide trail is to be developed along west side of the Range Road. In order to accommodate such a trail, it will be necessary to acquire land from adjacent property owners.

Traffic Noise

The results of sound level calculation showed that the noise levels are lower than the threshold noise level of 65dBA. The calculated future sound levels along the road varied between 53.6 dBA to 59.8 dBA. Hence, retrofit noise attenuation is not required during the period of 2001 and 2016.

Intersection Illumination

Analysis based on present traffic volume, partial or delineation lightings are warranted at Walmart/Ordze Road, Fountain Creek Road, Fountain Creek Way and Fountain Creek Boulevard.

8.2 ENVIRONMENTAL CONCERNS / MITIGATION

Roadway upgrading project include loss of soil quality, quantity and land capability, loss of natural vegetation/wetlands, loss/alteration of wildlife habitat, wildlife mortality, disruption of wildlife movements, sensory disturbance to wildlife, and disturbance to historical resources. Recommended mitigation measures include implementation of soil handling guidelines, minimizing loss of natural habitat, compensation for lost habitat, appropriate

scheduling of construction periods, and monitoring of wildlife/vehicle collisions. In addition, a rare plant and wildlife survey within natural habitats, and archaeological inspections are recommended for any finalized alignments prior to construction.

8.3 COST ESTIMATE

Table 8.1 shows the estimated cost for upgrading Range Roads. Estimate is divided into Multi-Use Trail, Intersection Treatment, Urban Roadway and Rural Roadway. Detailed cost estimate breakdown is presented in Appendix J.

Table 8.1 Summary of Cost Estimate

Item	Range Road 231	Range Road 232	Range Road 233	TOTAL
Multi-Use Trail	$ 118,000	$ 114,000	$ 114,000	$ 346,000
Intersection treatment	$ 114,000	$ 285,000	$ 545,000	$ 944,000
Urban Roadway	$ 1,284,000	$ 920,000	$ 1,589,000	$ 3,793,000
Rural Roadway	$ 1,760,000	$ 2,984,000	$ 2,240,000	$ 6,984,000
Total Estimated Cost (Rounded)	**$ 3,276,000**	**$ 4,303,000**	**$ 4,488,000**	**$ 12,067,000**

8.4 IMPLEMENTATION STARTEGY

Table 8.2 shows the implementation strategy.

Table 8.2 - Tentative Implementation Schedule

	Range Road 233			Range Road 232			Range Road 231		
Tasks	1-5 yrs.	6-10 yrs.	10-15 yrs.	1-5 yrs.	6-10 yrs.	10-15 yrs.	1-5 yrs.	6-10 yrs.	10-15 yrs.
Budget Approval									
Land Acquisition	X				X				X
Construction:									
Wye Rd./Wal-Mart Access	X								
RR 233 at Ordze Avenue	X								
Trail	X				X				X
Twinning		X				X			X
Intersection Improvements	X				X				X
Access Relocation	X					X			X
Posted Speed Review	X				X				X
RR 232/Wye Road:									
Intersection Review				X					
Intersection Construction					X				

NOTE: Schedule is tentative and subject to budget approvals, land acquisition process, adjacent and developments, traffic vo

8.5 LEVY COST RECOVERY SYSTEM

Based on discussion with Strathcona County, a levy cost was calculated dividing the total cost of road improvement by the total land area served by each Range Road. The following table shows the summary of levy cost per acres. A detailed breakdown of the calculation and area is shown in Appendix K. The levy cost for the land that were already developed will be born by the Strathcona County and the levy on the undeveloped land will be charged to the developer.

Table 8.3 Summary of Levy Cost

	Area (Acres)	Unit Levy Cost	Total Levy Cost
Range Road 231			
Developed Land	1,256	$ 2,606	$ 3,276,000
Undeveloped Land	0		0
Range Road 232			
Developed Land	1,256	$ 3,425	$ 4,303,000
Undeveloped Land	0		0
Range Road 233			
Developed Land	945	$ 3,607	$ 3,409,450
Undeveloped Land	300	$ 3,607	$ 1,078,547

9 PUBLIC CONSULTATION

The purpose of the public involvement program for the Range Roads 231, 232 and 233, from Highway 628 to Wye Road Functional Planning Study was to form a link between local residents/landowners, and the project team, for the purpose of sharing project concerns, determining ways to address those concerns, and the public's preferences for upgrading the roadways. Several activities were planned to facilitate public involvement and information exchange including public open houses, information sheets, and questionnaires.

9.1 PUBLIC INVOLVEMENT PROGRAM

The range roads public involvement program was run in synchronicity with the township road 530 program for expediency, the open houses for each of the functional planning studies were held one week apart, with exception of the final open houses, which were held on consecutive evenings in the same week. All aspects of the public involvement program discussed below were completed for both functional planning studies.

Mailing Lists

An initial project mailing list was prepared using a list of legal titles for landowners within the study area boundaries. The contacts from open house registration sheets, and the names of any individuals who otherwise contacted the project team were added to the initial list to provide an increasingly comprehensive list for project correspondence. This list was utilized for notification before each project open house.

Information Sheets

There were three project information sheets created to inform the public and stakeholders of the project background, key project information, and public input opportunities, as well as to provide the contact information for the project representative. The first information sheet was produced for open house #1 in October 2002, the second sheet was produced for open house #2 in November 2002, and the third information sheet was produced for open house #3 in April 2003. Copies of all three information sheets can be found in Appendix L.

The first information sheet contained details about:

- Project background
- Project objectives
- Key Study Issues
- Preliminary Improvement Strategies
- How members of the public can become involved and/or provide their input

The second information sheet contained information about:

- Project background
- Project objectives
- Preliminary proposals
- How members of the public can become involved and/or provide their input

The third information sheet contained details about:

- Project background
- Project objectives
- Recommended plan
- How members of the public can become involved and/or provide their input

9.2 OPEN HOUSE #1

Festival Place, Sherwood Park

The project team held its first Open House on October 2, 2002, in Sherwood Park's Festival Place.

Notification

Local residents were alerted to the event through a mail out to property owners, and an advertisement in the two local newspapers, the Sherwood Park News and Strathcona County This Week. A copy of the newspaper ad for open house #1 can be found in Appendix L. The ads ran on Friday, September 20 and Wednesday, September 20, 2002.

Attendance

One hundred and nineteen people signed in at the event, but true attendance was approximately 160, as several attendees did not sign-in, and other slips represented couples.

A number of information panels and drawings were created to supply basic project information, modelled after the details provided in the Project Information Sheet handout. The displays supplemented the information provided directly by the four project technical representatives circulating throughout the room. All attendees were given a detailed questionnaire and were encouraged to fill it out and return it before leaving the event. Some of these were completed and returned after the open house; the deadline to do so was October 9, 2002. In total, 90 questionnaires were returned.

Feedback

There were several key issues and preliminary concepts the public gave feedback on. A copy of the comment form distributed at open house #1, a one-page synopsis, and a summary of all the responses and comments received can be found in Appendix L at the back of this report.

9.3 OPEN HOUSE #2

Festival Place, Sherwood Park

The project team for held its second Open House on November 20, 2002, in Sherwood Park's Festival Place.

Notification

Local residents were alerted to the event through a mail out to property owners, and an advertisement in one local newspaper, Strathcona County This Week. A copy of the newspaper ad for open house #2 can be found in Appendix L. The ad ran on Friday, November 8 and Friday November 15, 2002.

Attendance

Eighty-three people signed in at the event, but true attendance was approximately 106, as several attendees did not sign-in, and other slips represented couples.

A number of project alternatives were created and displayed for the public to comment on. The Project Information Sheet handed out provided a general overview of the alternatives that were being shown. A summary of the feedback received at the first Open House and several information panels were shown to supply project information, modelled after the details from the previous Open House. The displays supplemented the information provided directly by the four project technical representatives circulating throughout the

room. All attendees were given a detailed questionnaire and were encouraged to fill it out and return it before leaving the event. Some of these were completed and returned after the open house; the deadline to do so was November 30, 2002. In total, 57 questionnaires were returned.

Feedback

There were several key issues and alternatives that the public gave feedback on. A copy of the comment form distributed at open house #2, a one-page synopsis and a summary of all the responses and comments received can be found in Appendix L at the back of this report.

9.4 OPEN HOUSE #3

Strathcona County Building, Sherwood Park

The project team held its third, and final, Open House on April 23, 2003, in the Strathcona County Building.

Notification

Local residents were alerted to the event through a mail out to property owners, and an advertisement in the one local newspaper, Strathcona County This Week. A copy of the newspaper ad for open house #3 can be found in Appendix L. The ad ran on Friday, April 11 and Friday, April 28, 2003.

Attendance

Seventy-four people signed in at the event, but true attendance was approximately 88, as several attendees did not sign-in, and other slips represented couples.

A number of drawings of the "recommended plan" were created and displayed for the public to comment on. The Project Information Sheet handed out provided a general overview of the "recommended plan" that was being shown. A summary of the feedback received at the second Open House and several information panels were shown to supply project information, modeled after the details from the previous Open House. The displays supplemented the information provided directly by the four project technical representatives circulating throughout the room. All attendees were given a detailed questionnaire and were encouraged to fill it out and return it before leaving the event. Some of these were

completed and returned after the open house; the deadline to do so was April 30, 2003. In total, 42 questionnaires were returned.

Feedback

There were several aspects to the "recommended plan" that the public gave feedback on. A copy of the comment form distributed at open house #3, a one-page synopsis and a summary of all the responses and comments received can be found in Appendix L at the back of this report.

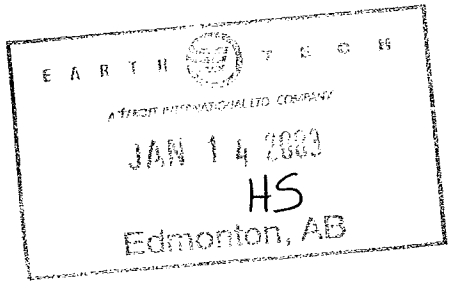
APPENDIX A

HIGHWAY 628 TRAFFIC COUNT AND PROJECTION INFORMATION

Strathcona County

2001 Sherwood Drive
Sherwood Park, AB T8A 3W7
Fax (780) 464-8116
www.strathcona.ab.ca

ENGINEERING AND ENVIRONMENTAL PLANNING



January 8, 2003

Earth Tech (Canada) Inc.
17203 – 103 Ave.
Edmonton, AB
T5S 1J4

Attention: Mr. Hassan Shaheen

Dear Sir:

Re: Highway 628 Traffic Count and Projection Information

Please find attached copies of a.m./p.m. peak, current and projected traffic counts for Highway 628 at the intersections with Range Road 231, 232 and 233 that were conducted by Stantec Consulting.

Also attached is a summary spreadsheet, completed by Strathcona County, of peak traffic volumes on the above noted range roads at the proposed intersections for service or country residential road(s) directly north of Highway 628. Also included is traffic data on Highway 628 at the existing country residential subdivisions for westbound only lanes.

Strathcona County's studies for country residentials have shown a fairly wide range for a.m. and p.m. traffic generation, 0.880 vph (a.m.) and 1.00 vph (p.m.) per dwelling can be anticipated.

Please note that information provided by Stantec remains their property.

If you have any questions regarding the above, please contact me at 464-8091 or Dan Schilbe at 464-8293.

Yours truly,

Chris E. Batty, P. Eng., M. Eng., PTOE
COORDINATOR, TRANSPORTATION ENGINEERING

CB/DS:dw

attachment

pc: Dave Friesen, Strathcona County



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	88	209	3	6	707	37	6	22	1	6	38	136
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 (veh/h)	96	227	3	7	768	40	7	24	1	7	41	148
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)									3			3
Median type								None			None	
Median storage veh)												
vC, conflicting volume	809			230			1296	1242	229	1233	1223	789
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.2	6.6	6.2	7.2	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			100			89	84	100	95	73	62
cM capacity (veh/h)	804			1320			61	151	803	121	155	386

815 WB

160

SB 196 VPH

NB

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	96	230	7	809	32	196
Volume Left	96	0	7	0	7	7
Volume Right	0	3	0	40	1	148
cSH	804	1700	1320	1700	935	536
Volume to Capacity	0.12	0.14	0.00	0.48	0.03	0.36
Queue Length (m)	3.1	0.0	0.1	0.0	0.8	12.6
Control Delay (s)	10.1	0.0	7.7	0.0	9.0	15.5
Lane LOS	B		A		A	C
Approach Delay (s)	3.0		0.1		9.0	15.5
Approach LOS					A	C

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	65.4%	ICU Level of Service	B

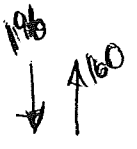
233

Current

628 WB = 815 ÷ 2

233 NB(160) + SB(196) = 356

196 ↓ ↑ 160





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	75	64	9	3	100	10	38	39	2	1	47	209
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 (veh/h)	82	70	10	3	109	11	41	42	2	1	51	227
Pedestrians												
Lane Width (m)					12.3						279	
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)		135 NB							3			3
Median type								None			None	
Median storage veh)												
vC, conflicting volume	120			79			492	364	74	376	363	114
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.2	6.6	6.2	7.2	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			87	92	100	100	90	76
cM capacity (veh/h)	1450			1500			323	527	979	516	527	930

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	82	79	3	120	86	279
Volume Left	82	0	3	0	41	1
Volume Right	0	10	0	11	2	227
cSH	1450	1700	1500	1700	1405	1457
Volume to Capacity	0.06	0.05	0.00	0.07	0.06	0.19
Queue Length (m)	1.4	0.0	0.0	0.0	1.5	5.4
Control Delay (s)	7.6	0.0	7.4	0.0	7.7	8.1
Lane LOS	A		A		A	A
Approach Delay (s)	3.9		0.2		7.7	8.1
Approach LOS					A	A

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	35.0%	ICU Level of Service	A

628 WB = 123

231 NB (85) + SB (279) = 414

231 123.

CURRENT



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	168	392	32	11	827	59	27	50	22	47	9	354
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 (veh/h)	183	426	35	12	899	64	29	54	24	51	10	385
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)									3			3
Median type								None			None	
Median storage veh)												
vC, conflicting volume	963			461			1929	1796	443	1785	1781	931
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.2	6.6	6.2	7.2	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	74			99			0	6	96	0	83	0
cM capacity (veh/h)	703			1085			0	58	608	8	59	319

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	183	461	12	963	108	446
Volume Left	183	0	12	0	29	51
Volume Right	0	35	0	64	24	385
cSH	703	1700	1085	1700	23	77
Volume to Capacity	0.26	0.27	0.01	0.57	4.61	5.76
Queue Length (m)	7.9	0.0	0.3	0.0	Err	Err
Control Delay (s)	11.9	0.0	8.4	0.0	Err	Err
Lane LOS	B		A		F	F
Approach Delay (s)	3.4		0.1		9999.0	9999.0
Approach LOS					F	F

Intersection Summary			
Average Delay	2548.3		
Intersection Capacity Utilization	89.5%	ICU Level of Service	D

NB 628 = 975

233

For 2012

23 NB (301) + SB (446) = 747



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	75	257	55	13	109	17	139	52	5	10	39	287
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 (veh/h)	82	279	60	14	118	18	151	57	5	11	42	312
Pedestrians												
Lane Width (m)					150 WB						365 SB	
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)									3			3
Median type	NB	157						None			None	
Median storage veh)												
vC, conflicting volume	137			339			796	638	309	629	658	128
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.2	6.6	6.2	7.2	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			99			12	84	99	97	88	66
cM capacity (veh/h)	1429			1203			171	364	724	324	354	914

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	82	339	14	137	213	365
Volume Left	82	0	14	0	151	11
Volume Right	0	60	0	18	5	312
cSH	1429	1700	1203	1700	650	1263
Volume to Capacity	0.06	0.20	0.01	0.08	0.33	0.29
Queue Length (m)	1.4	0.0	0.3	0.0	10.8	9.2
Control Delay (s)	7.7	0.0	8.0	0.0	13.2	9.0
Lane LOS	A		A		B	A
Approach Delay (s)	1.5		0.8		13.2	9.0
Approach LOS					B	A

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	49.7%	ICU Level of Service	A

628 NB = 150

231 For 2012

NB (157) + SB (365) = 522

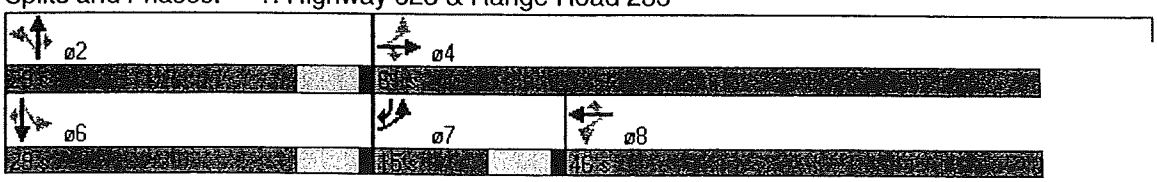
NB = 329

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	4.0
Satd. Flow (prot)	1738	3476	1555	1738	3476	1555	0	1771	1555	0	1769	1555
Flt Permitted	0.087			0.390				0.748			0.731	
Satd. Flow (perm)	159	3476	1555	714	3476	1555	0	1369	1555	0	1337	1555
Satd. Flow (RTOR)			96	WB 1432		71			101		492	16
Volume (vph)	201	632	88	31	1332	69	116	59	93	54	26	412
Lane Group Flow (vph)	218	687	96	34	1448	75	0	190	101	0	87	448
Turn Type	pm+pt		Perm	Perm		Perm	Perm		Perm	Perm		pm+ov
Protected Phases	7	4			8			2			6	7
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phases	7	4	4	8	8	8	2	2	2	6	6	7
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	6.0
Minimum Split (s)	12.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	12.0
Total Split (s)	15.0	61.0	61.0	46.0	46.0	46.0	29.0	29.0	29.0	29.0	29.0	15.0
Total Split (%)	17%	68%	68%	51%	51%	51%	32%	32%	32%	32%	32%	17%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead			Lag	Lag	Lag						Lead
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						Yes
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	53.0	53.0	53.0	37.9	37.9	37.9		17.7	17.7		17.7	32.8
Actuated g/C Ratio	0.67	0.67	0.67	0.48	0.48	0.48		0.22	0.22		0.22	0.42
v/c Ratio	0.66	0.29	0.09	0.10	0.87	0.10		0.62	0.24		0.29	0.68
Uniform Delay, d1	12.2	5.2	0.0	11.1	18.0	0.6		27.4	0.0		25.2	18.0
Delay	21.9	5.9	1.5	12.9	21.5	3.9		28.8	5.9		26.6	19.3
LOS	C	A	A	B	C	A		C	A		C	B
Approach Delay		9.0			20.5			20.8			20.5	
Approach LOS		A			C			C			C	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 78.9
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 17.1 Intersection LOS: B
Intersection Capacity Utilization 88.1% ICU Level of Service D

Splits and Phases: 1: Highway 628 & Range Road 233



233
Long Term

628 NB = 1432

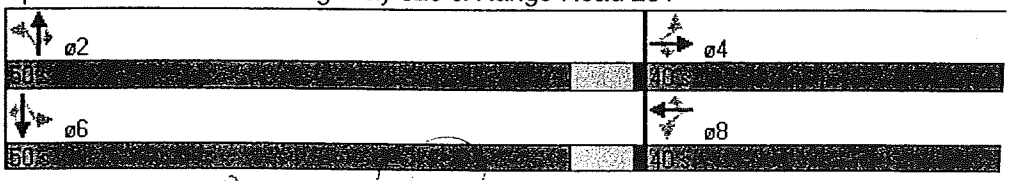
233 NB (329)+53(492) = 821

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	4.0
Satd. Flow (prot)	1738	3476	1555	1738	3476	1555	0	1760	1555	0	1815	1555
Flt Permitted	0.452			0.359				0.719			0.937	
Satd. Flow (perm)	827	3476	1555	657	3476	1555	0	1316	1555	0	1714	1555
Satd. Flow (RTOR)			93		433	23			9		101	273
Volume (vph)	90	519	86	20	392	21	238	62	8	12	59	333
Lane Group Flow (vph)	98	564	93	22	426	23	0	326	9	0	77	362
Turn Type	Perm		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phases	4	4	4	8	8	8	2	2	2	6	6	6
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	44%	44%	44%	44%	44%	44%	56%	56%	56%	56%	56%	56%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	14.8	14.8	14.8	14.8	14.8	14.8		17.4	17.4		17.4	17.4
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36		0.43	0.43		0.43	0.43
v/c Ratio	0.33	0.45	0.15	0.09	0.34	0.04		0.58	0.01		0.11	0.44
Uniform Delay, d1	9.0	9.5	0.0	8.2	9.1	0.0		8.5	0.0		6.7	1.7
Delay	11.9	10.9	3.4	11.1	10.5	5.6		9.8	4.9		7.7	2.7
LOS	B	B	A	B	B	A		A	A		A	A
Approach Delay		10.1			10.3			9.7			3.6	
Approach LOS		B			B			A			A	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 40.8
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 8.6 Intersection LOS: A
Intersection Capacity Utilization 62.1% ICU Level of Service B

Splits and Phases: 3: Highway 628 & Range Road 231



231
Long Term

Volume
1: Highway 628 & Range Road 233

Highway 628 Traffic Analysis (135-55050)
11/26/2002

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	289	645	5	4	306	38	3	33	5	52	43	148
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	314	701	5	4	333	41	3	36	5	57	47	161
Lane Group Flow (vph)	314	706	0	4	374	0	0	39	5	0	104	161

WB = 348

NB (360) + SB (243) = 603

33
current

Volume
2: Highway 628 & Range Road 232

NB = 406

Highway 628 Traffic Analysis (135-55050)
11/26/2002

Volume (vph)	285	407	10	5	256	16	8	105	19	22	48	84
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	310	442	11	5	278	17	9	114	21	24	52	91
Lane Group Flow (vph)	310	453	0	5	295	0	0	123	21	0	76	91

WB = 277

NB (406) + SB (154) = 560

232 232

CU comment

Volume
3: Highway 628 & Range Road 231

NB

Highway 628 Traffic Analysis (135-55050)
11/26/2002

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	325	95	28	1	179	11	10	65	1	20	61	88
Conf. Peds. (#/hr)												
Confl. Bikes (#/hr)					191							
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	353	103	30	1	195	12	11	71	1	22	66	96
Lane Group Flow (vph)	353	133	0	1	207	0	0	82	1	0	88	96

231

67% WB = 191

Comments

231 NB (401) + SB (169) = 570

Volume
1: Highway 628 & Range Road 233

NB 455

Highway 628 Traffic Analysis (135-55050)
11/26/2002



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	393	919	30	24	436	52	35	10	12	65	55	187
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	427	999	33	26	474	57	38	11	13	71	60	203
Lane Group Flow (vph)	427	1032	0	26	531	0	0	49	13	0	131	203

512

233

2012

628
WB = 512

233 NB (455) + SB (307) = 762

Volume
2: Highway 628 & Range Road 232

WB = 426

Highway 628 Traffic Analysis (135-55050)
11/26/2002



	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	386	571	39	19	389	22	32	18	8	23	51	91
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)				WB 430						SB 165		
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	420	621	42	21	423	24	35	20	9	25	55	99
Lane Group Flow (vph)	420	663	0	21	447	0	0	55	9	0	80	99

232
2012

628 WB 430

232 NB (426) + SB (165) = 591

Volume
3: Highway 628 & Range Road 231

NB 372

Highway 628 Traffic Analysis (135-55050)
11/26/2002

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	319	129	154	6	286	11	61	42	14	19	58	83
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	347	140	167	7	311	12	66	46	15	21	63	90
Lane Group Flow (vph)	347	307	0	7	323	0	0	112	15	0	84	90

WB 303

53 160

231
2012

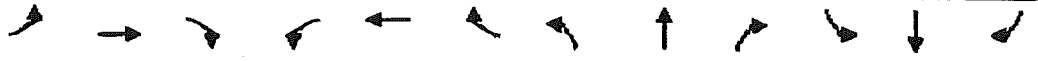
WB 62% = 303

231 NB (372)+53(160)=532

Volume
1: Highway 628 & Range Road 233

NB 547

Highway 628 Traffic Analysis (135-55050)
11/26/2002



	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	458	1480	129	103	702	60	98	29	34	77	66	223
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	498	1609	140	112	763	65	107	32	37	84	72	242
Lane Group Flow (vph)	498	1609	140	112	763	65	0	139	37	0	156	242

WB 865

SB 366

233

Long Term

628

WB = 865

233 NB (547) + SB (366) = 913

NB 510

Volume
2: Highway 628 & Range Road 232

Highway 628 Traffic Analysis (135-55050)
11/26/2002

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	446	1024	121	61	687	25	69	39	18	28	61	109
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)					773						198	
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	485	1113	132	66	747	27	75	42	20	30	66	118
Lane Group Flow (vph)	485	1113	132	66	747	27	0	117	20	0	96	118

Intersection Summary

232

Long Term

628
WB = 773

NB (510) + SB (198) = 708

Volume
3: Highway 628 & Range Road 231

NB 449

Highway 628 Traffic Analysis (135-55050)
11/26/2002

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	370	436	264	9	577	13	96	66	22	23	69	100
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)					599						192	
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	402	474	287	10	627	14	104	72	24	25	75	109
Lane Group Flow (vph)	402	474	287	10	627	14	0	176	24	0	100	109

628
WB = 599

231
Lane Trim

NB (449) + 50 (192) = 641

STRATHCONA COUNTY

Fax: (780) 464-8116
Engineering and Environmental Planning Department
2001 Sherwood Drive
Sherwood Park, AB Canada T8A 3W7

PLEASE TRANSMIT THE FOLLOWING CORRESPONDENCE TO:		
NAME: HASSAN SHAHEEN		FAX: (780) 488 - 2121
FIRM: EARTH TECH		
RE: VOLUME COUNTS REQUESTE		
FROM: EEP STRATHCONA COUNTY		PHONE: 464 - 8071
DATE: Dec. 20/2002	TIME: 10:20.	# OF PAGES (INCLUDING COVER SHEET)
ORIGINAL TO FOLLOW IN MAIL: YES NO		
FURTHER INSTRUCTIONS: ANY QUESTIONS JUST PHONE CORY CHARTRAND @ 464-8071.		

IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CONTACT THE ORIGINATOR AS SOON AS POSSIBLE.
A08

HBB - CITY.
HASSAN SHAHEEN.
EPCOR TECH.

This is Report Line Number One
This is Report Line Number Two

10-21-2002 *** Weekly Summary For Week Of September 24, 2002 *** 09:18 Pg 1

File: M0902022.PRN Sta: 000000000007 Id: 000000250817 CommId: 01
City/Town: SHERWOOD PARK County: STRATHCONA
Location: Rge Rd 231 South of Wye Rd Volume-Total Format: Lane
Lane/s: 1-1
Ln1-North

Time	29 Sun	30 Mon	24 Tue	25 Wed	26 Thu	27 Fri	28 Sat			Daily Avg.	Wkday Avg.	Wkend Avg.
01:00	70	10	12	16	17	20	56			29	15	63
02:00	40	4	7	10	7	5	43			17	7	42
03:00	32	3	6	4	4	4	20			10	4	26
04:00	19	1	5	2	1	4	18			7	3	19
05:00	7	4	7	4	7	6	6			6	6	7
06:00	6	17	17	18	12	12	12			13	15	9
07:00	7	58	51	64	63	62	19			46	60	13
08:00	22	154	152	182	173	138	45	SB - 321	TOTAL - 481	124	160	34
09:00	45	248	260	261	274	239	104	- 295	551	204	256	75
10:00	110	118	147	115	143	142	132			130	133	121
11:00	109	117	95	100	122	109	153			115	109	131
12:00	147	-	156	163	137	164	167			156	155	157
13:00	221	-	163	141	188	151	223			181	161	222
14:00	188	-	169	144	161	177	221			177	163	205
15:00	217	-	168	166	174	215	226			194	181	222
16:00	248	-	304	242	275	280	233			264	275	241
17:00	251	-	378	352	388	376	297	- 257	- 631	340	374	274
18:00	234	-	329	353	352	346	250	- 243	588	311	345	242
19:00	152	-	236	239	227	239	251			224	235	202
20:00	137	-	173	174	212	192	174			177	188	156
21:00	144	-	178	135	177	179	136			158	167	140
22:00	84	-	113	117	119	136	133			117	121	109
23:00	40	-	64	54	77	98	121			76	73	81
24:00	34	-	25	53	36	93	115			59	52	75
Totals	2564	734	3215	3109	3346	3387	3155	- 3233	- 6589	3135	3256	2860
% Avg Wkday	78.7	22.5	98.7	95.5	102.8	104.0	96.9					
% Avg Day	81.8	23.4	102.6	99.2	106.7	108.0	100.6					
AM Peak Hr	12:00	09:00	09:00	09:00	09:00	09:00	12:00					
AM Count	147	248	260	261	274	239	167					
PM Peak Hr	17:00	None	17:00	18:00	17:00	17:00	17:00					
PM Count	251	-	378	353	388	376	297					

This is Report Line Number One
This is Report Line Number Two

10-21-2002 *** Weekly Summary For Week Of September 24, 2002 *** 09:18 Pg 2

File: M0902022.PRN Sta: 000000000007 Id: 000000250817 CommId: 01
City/Town: SHERWOOD PARK County: STRATHCONA
Location: Rge Rd 231 South of Wye Rd Volume-Total Format: Lane
Lane/s: 2-2
Ln2-South

Time	29 Sun	30 Mon	24 Tue	25 Wed	26 Thu	27 Fri	28 Sat	Daily Avg.	Wkday Avg.	Wkend Avg.
01:00	52	10	13	12	7	28	39	23	14	46
02:00	35	8	4	4	5	0	21	11	4	28
03:00	20	0	4	5	5	4	16	8	4	18
04:00	8	4	5	4	4	3	4	5	4	6
05:00	6	7	5	4	6	2	7	5	5	7
06:00	5	28	30	30	23	24	10	21	27	8
07:00	12	110	113	111	136	127	30	91	119	21
08:00	28	334	330	326	316	298	78	244	321	53
09:00	57	292	311	298	271	302	146	240	295	102
10:00	99	132	137	146	144	152	154	138	142	127
11:00	148	114	141	109	146	161	190	144	134	169
12:00	190	-	129	167	175	169	199	172	160	195
13:00	248	-	208	167	180	210	243	209	191	246
14:00	199	-	204	157	192	174	213	190	182	206
15:00	189	-	138	183	159	181	229	180	165	209
16:00	194	-	261	232	267	248	229	239	252	212
17:00	196	-	232	231	280	285	242	244	257	219
18:00	164	-	241	211	257	263	207	224	243	186
19:00	131	-	217	205	224	244	205	204	223	168
20:00	125	-	169	162	161	176	138	155	167	132
21:00	95	-	125	121	110	127	151	122	121	123
22:00	81	-	100	104	80	125	141	105	102	111
23:00	50	-	55	50	61	98	103	70	66	77
24:00	11	-	18	24	33	66	71	37	35	41
Totals	2343	1039	3190	3063	3242	3467	3066	3080	3233	2705
% Avg Wkday	72.5	32.1	98.7	94.7	100.3	107.2	94.8			
% Avg Day	76.1	33.7	103.6	99.4	105.3	112.6	99.5			
AM Peak Hr	12:00	08:00	08:00	08:00	08:00	09:00	12:00			
AM Count	190	334	330	326	316	302	199			
PM Peak Hr	13:00	None	16:00	16:00	17:00	17:00	13:00			
PM Count	248	-	261	232	280	285	243			

Weekly Summary for the Week November 22, 2002

Sta: 000000000003 Id: 0000000020223

City/Town: Sherwood Park County: Strathcona

Location: Rge Rd 232 South of Wye Rd Vol-Tot

Lane : NB

Time	24 Sun	25 Mon	26 Tue	27 Wed	28 Thur	22 Fri	23 Sat	Daily Avg	Wkday Avg	Wkend Avg
1:00	42	12	15	0	0	20	32	17	9	37
2:00	41	8	7	0	0	14	30	14	6	36
3:00	26	4	2	0	0	7	16	8	3	21
4:00	16	5	3	0	0	10	9	6	4	13
5:00	5	8	3	0	0	6	7	4	3	6
6:00	10	18	20	0	0	17	8	10	11	9
7:00	17	50	70	0	0	52	17	29	34	17
8:00	14	129	141	0	0	148	39	67	84	27
9:00	57	249	225	0	0	249	84 SB - 156	123	145	71
10:00	102	145	148	0	0	163	146 TOT - 279	101	91	124
11:00	116	128	130	0	0	164	165	100	84	141
12:00	142	170	161	0	0	180	194	121	102	168
13:00	199	147	181	0	0	179	217	132	101	208
14:00	184	141	154	0	0	183	222	126	96	203
15:00	233	154	165	0	0	187	233	139	101	233
16:00	245	138	245	0	0	254	268	164	127	257
17:00	173	305	238	0	0	304	255 SB - 226	182	169	214
18:00	109	288	300	0	0	294	219 TOT - 408	173	176	164
19:00	74	193	218	0	0	126	166	111	107	120
20:00	106	130	153	0	0	160	119	95	89	113
21:00	151	83	122	0	0	145	100	86	70	126
22:00	104	96	95	0	0	138	110	78	66	107
23:00	65	64	62	0	0	89	67	50	43	66
24:00	33	37	32	0	0	69	64 SB - 2897	34	28	49
Totals	2264	2702	2890			3158	2787 TOT - 4869	1972	1750	2526
% Avg Wkday	129.4	154.4	165.1	0.0	0.0	180.5	159.3			
% Avg Day	114.8	137.0	146.6	0.0	0.0	160.2	141.4			
AM Peak Hr Ending	12:00	9:00	9:00	5:00	5:00	9:00	12:00			
AM Count	142	249	225	0	0	249	194			
PM Peak Hr Ending	16:00	17:00	18:00	13:00	13:00	17:00	16:00			
PM Count	245	305	300	0	0	304	268			

This is Report Line Number One
This is Report Line Number Two

12-20-2002 *** Weekly Summary For Week Of November 22, 2002 *** 09:35 Pg 1

File: M1102027.PRN Sta: 000000000009 Id: 000000250119 CommId: 01
City/Town: SHERWOOD PARK County: STRATHCONA
Location: Rge Rd 232 South of Wye Rd Vol-South Format: Lane
Lane/s: 1-1
Ln1-South

Time	24 Sun	25 Mon	26 Tue	27 Wed	28 Thu	22 Fri	23 Sat	Daily Avg.	Wkday Avg.	Wkend Avg.
01:00	53	13	12	-	-	15	50	29	13	52
02:00	26	2	7	-	-	14	20	14	8	23
03:00	25	2	1	-	-	7	20	11	3	23
04:00	18	4	7	-	-	8	8	9	6	13
05:00	9	18	6	-	-	9	5	9	11	7
06:00	7	28	31	-	-	28	20	23	29	14
07:00	13	101	109	-	-	107	31	72	106	22
08:00	25	249	238	-	-	232	60	161	240	43
09:00	51	203	212	-	-	198	117	156	204	84
10:00	98	136	129	-	-	175	135	135	147	117
11:00	134	145	150	-	-	132	166	145	142	150
12:00	171	159	146	-	-	160	204	168	155	188
13:00	240	180	149	-	-	181	250	200	170	245
14:00	253	147	162	-	-	178	290	206	162	272
15:00	227	165	194	-	-	192	231	202	184	229
16:00	227	216	211	-	-	245	258	231	224	243
17:00	159	231	251	-	-	248	239	226	243	199
18:00	111	255	240	-	-	252	208	213	249	160
19:00	66	176	198	-	-	238	193	174	204	130
20:00	123	155	149	-	-	173	131	146	159	127
21:00	155	124	142	-	-	110	100	126	125	128
22:00	99	133	139	-	-	113	90	115	128	95
23:00	60	55	82	-	-	96	71	73	78	66
24:00	26	26	38	-	-	94	82	53	53	54
Totals	2376	2923	3003	-	-	3205	2979	2897	3044	2678
% Avg Wkday	78.1	96.0	98.7	-	-	105.3	97.9			
% Avg Day	82.0	100.9	103.7	-	-	110.6	102.8			
AM Peak Hr	12:00	08:00	08:00	None	None	08:00	12:00			
AM Count	171	249	238	-	-	232	204			
PM Peak Hr	14:00	18:00	17:00	None	None	18:00	14:00			
PM Count	253	255	251	-	-	252	290			

This is Report Line Number One
This is Report Line Number Two

09-23-2002 *** Weekly Summary For Week Of September 8, 2002 *** 14:06 Pg 2

File: M0902010.PRN Sta: 000000000008 Id: 000000250218 CommId: 01
City/Town: SHERWOOD PARK County: STRATHCONA
Location: Rge Rd 233 North of Ordze Ave. Vol-Total Format: Lane
Lane/s: 2-2
Ln2-North

Time	8 Sun	9 Mon	10 Tue	11 Wed	12 Thu	13 Fri	14 Sat			Daily Avg.	Wkday Avg.	Wkend Avg.
01:00			17	28	29					25	25	0
02:00			9	7	11					9	9	0
03:00			5	7	8					7	7	0
04:00			10	6	11					9	9	0
05:00			4	4	9					6	6	0
06:00			20	24	29					24	24	0
07:00			121	102	111					111	111	0
08:00			214	200	226			48 - 306	TOTAL - 519	213	213	0
09:00			339	320	321			- 402	- 729	327	327	0
10:00			355	312	326					331	331	0
11:00			416	370	363					383	383	0
12:00			491	467	500			- 557	-1043	486	486	0
13:00			510	539	562			- 606	-1143	537	537	0
14:00			537	565	497					533	533	0
15:00			566	598	531					565	565	0
16:00			550	543	577					557	557	0
17:00			626	671	668			- 555	-1210	655	655	0
18:00			686	672	659			- 642	-1314	672	672	0
19:00			559	538	551					549	549	0
20:00			532	511	520					521	521	0
21:00			408	457	511					459	459	0
22:00			329	282	339					317	317	0
23:00			143	124	122					130	130	0
24:00			48	61	44					51	51	0
Totals	-	-	7495	7408	7525	-	-	- 8064	15540	7476	7476	0
% Avg Wkday	-	-	100.3	99.1	100.7	-	-					
% Avg Day	-	-	100.3	99.1	100.7	-	-					
AM Peak Hr	None	None	12:00	12:00	12:00	None	None					
AM Count	-	-	491	467	500	-	-					
PM Peak Hr	None	None	18:00	18:00	17:00	None	None					
PM Count	-	-	686	672	668	-	-					

This is Report Line Number One
This is Report Line Number Two

09-23-2002 *** Weekly Summary For Week Of September 8, 2002 *** 14:06 Pg 1

File: M0902010.PRN Sta: 000000000008 Id: 000000250218 CommId: 01
City/Town: SHERWOOD PARK County: STRATHCONA
Location: Rge Rd 233 North of Ordze Ave. Vol-Total Format: Lane
Lane/s: 1-1
Ln1-South

Time	8 Sun	9 Mon	10 Tue	11 Wed	12 Thu	13 Fri	14 Sat	Daily Avg.	Wkday Avg.	Wkend Avg.
01:00			19	16	25			20	20	0
02:00			7	9	6			7	7	0
03:00			2	3	6			4	4	0
04:00			14	10	9			11	11	0
05:00			6	2	8			5	5	0
06:00			35	30	39			35	35	0
07:00			153	131	141			142	142	0
08:00			301	298	319			306	306	0
09:00			418	388	401			402	402	0
10:00			409	407	399			405	405	0
11:00			507	487	484			493	493	0
12:00			601	511	558			557	557	0
13:00			589	605	624			606	606	0
14:00			585	574	578			579	579	0
15:00			554	617	587			586	586	0
16:00			620	603	586			603	603	0
17:00			650	356	659			555	555	0
18:00			649	649	627			642	642	0
19:00			573	603	685			620	620	0
20:00			571	612	612			598	598	0
21:00			444	462	509			472	472	0
22:00			223	275	271			256	256	0
23:00			111	115	104			110	110	0
24:00			62	31	59			51	51	0
Totals	-	-	8103	7794	8296	-	-	8064	8064	0
% Avg Wkday	-	-	100.5	96.6	102.9	-	-			
% Avg Day	-	-	100.5	96.6	102.9	-	-			
AM Peak Hr	None	None	12:00	12:00	12:00	None	None			
AM Count	-	-	601	511	558	-	-			
PM Peak Hr	None	None	17:00	18:00	19:00	None	None			
PM Count	-	-	650	649	685	-	-			

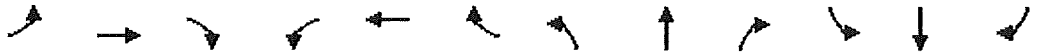
APPENDIX B

SYNCHRO RESULTS



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.909		0.966			
Flt Protected	0.984					0.985
Satd. Flow (prot)	1718	0	1856	0	0	1892
Flt Permitted	0.984					0.985
Satd. Flow (perm)	1718	0	1856	0	0	1892
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	60		59			59
Link Distance (m)	453.7		157.0			33.9
Travel Time (s)	27.2		9.6			2.1
Volume (vph)	20	41	205	70	50	109
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	41	205	70	50	109
Lane Group Flow (vph)	61	0	275	0	0	159
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	39.7%
	ICU Level of Service A



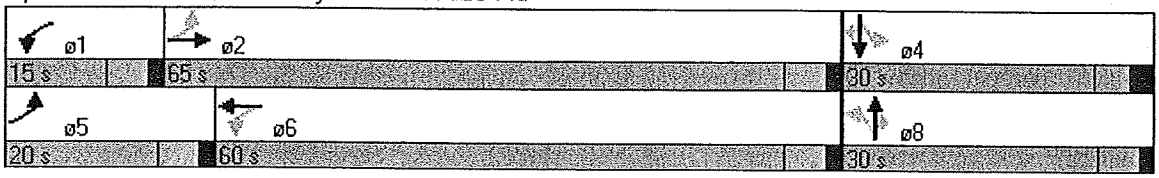
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	40.0		0.0	15.0		15.0	40.0		5.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	3.5	4.5	4.5	3.5	4.5	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	20		15	25		15
Lane Util. Factor	1.00	*0.85	0.91	1.00	*0.75	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.984				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	4874	0	1825	4253	0	1825	1921	1633	1825	1921	1633
Flt Permitted	0.250			0.071			0.728			0.725		
Satd. Flow (perm)	480	4874	0	136	4253	0	1399	1921	1633	1393	1921	1633
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			21				116			137
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		60			60			59			59	
Link Distance (m)		299.3			340.0			33.9			214.2	
Travel Time (s)		18.0			20.4			2.1			13.1	
Volume (vph)	240	2184	71	44	657	78	81	49	116	113	44	137
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	240	2184	71	44	657	78	81	49	116	113	44	137
Lane Group Flow (vph)	240	2255	0	44	735	0	81	49	116	113	44	137
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		4
Detector Phases	5			1			8	8		4	4	
Minimum Initial (s)	5.0	24.0		5.0	24.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	10.5	29.5		10.5	29.5		29.5	29.5	29.5	30.0	30.0	30.0
Total Split (s)	20.0	65.0	0.0	15.0	60.0	0.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	18%	59%	0%	14%	55%	0%	27%	27%	27%	27%	27%	27%
Maximum Green (s)	14.5	59.5		9.5	54.5		24.5	24.5	24.5	24.0	24.0	24.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	2.5	2.5	2.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?		Yes										
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	Min	Coord		None	Coord		Min	Min	Min	Min	Min	Min
Walk Time (s)		13.0			13.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		11.0			11.0		16.0	16.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		5			5		5	5	5	5	5	5
Act Effct Green (s)	82.4	71.7		76.6	66.7		18.5	18.5	18.5	18.5	18.5	18.5
Actuated g/C Ratio	0.75	0.65		0.70	0.61		0.17	0.17	0.17	0.17	0.17	0.17
v/c Ratio	0.48	0.71		0.19	0.28		0.34	0.15	0.31	0.48	0.14	0.35
Uniform Delay, d1	3.8	13.1		3.8	10.0		40.3	38.9	0.0	41.3	38.8	0.0
Delay	4.3	14.0		7.9	19.9		39.6	37.7	6.8	40.9	37.5	6.3
LOS	A	B		A	B		D	D	A	D	D	A
Approach Delay		13.0			19.3			23.8			24.3	

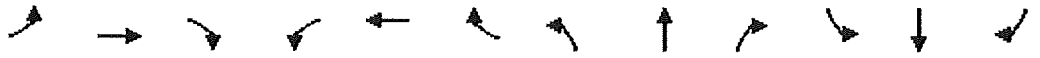
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			C			C	
90th %ile Green (s)	13.5	60.3		8.7	55.5		24.5	24.5	24.5	24.0	24.0	24.0
90th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Ped	Ped	Ped
70th %ile Green (s)	10.6	67.4		7.5	64.3		18.6	18.6	18.6	18.1	18.1	18.1
70th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	9.3	70.5		6.8	68.0		16.2	16.2	16.2	15.7	15.7	15.7
50th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	8.3	71.8		6.2	69.7		15.5	15.5	15.5	15.0	15.0	15.0
30th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Min	Min	Min
10th %ile Green (s)	7.3	83.5		0.0	70.7		15.5	15.5	15.5	15.0	15.0	15.0
10th %ile Term Code	Gap	Coord		Skip	Coord		Hold	Hold	Hold	Min	Min	Min
Queue Length 50th (m)	11.2	112.6		4.6	48.1		15.8	9.3	0.0	22.7	8.3	0.0
Queue Length 95th (m)	24.9	164.3		11.5	61.5		27.8	18.4	13.7	37.2	16.7	14.9
Internal Link Dist (m)		275.3			316.0			9.9			190.2	
50th Up Block Time (%)							35%					
95th Up Block Time (%)							52%	38%	21%			
Turn Bay Length (m)	50.0			40.0			15.0		15.0	40.0		5.0
50th Bay Block Time %		20%					10%					
95th Bay Block Time %		29%			13%		39%	19%	2%			43%
Queuing Penalty (veh)		58			3		75	17	12			33

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 15.9 Intersection LOS: B
Intersection Capacity Utilization 80.9% ICU Level of Service D
* User Entered Value

Splits and Phases: 3: Wye Rd & Ordze Rd





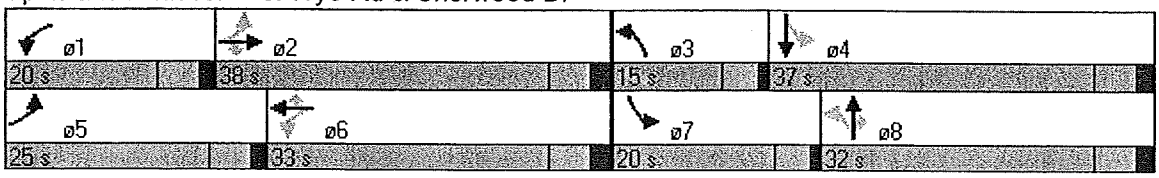
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	100.0		10.0	60.0		10.0	35.0		10.0	0.0		100.0
Storage Lanes	2		1	1		1	1		1	0		0
Total Lost Time (s)	4.5	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	3.5	5.0	5.0
Leading Detector (m)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3541	4611	1633	1825	4611	1633	1825	3650	1633	1825	3625	0
Flt Permitted	0.378			0.138			0.460			0.286		
Satd. Flow (perm)	1409	4611	1633	265	4611	1633	884	3650	1633	549	3625	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			26			84			51		5	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		153.8			320.0			108.0			120.0	
Travel Time (s)		9.2			19.2			6.5			7.2	
Volume (vph)	679	1352	137	185	384	132	75	496	132	253	428	21
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	679	1352	137	185	384	132	75	496	132	253	428	21
Lane Group Flow (vph)	679	1352	137	185	384	132	75	496	132	253	449	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phases	5		2	1		6	3	8	8	7	4	
Minimum Initial (s)	7.0	22.0	22.0	5.0	22.0	22.0	5.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	12.5	28.0	28.0	10.5	28.0	28.0	9.5	32.0	32.0	10.0	32.0	
Total Split (s)	25.0	38.0	38.0	20.0	33.0	33.0	15.0	32.0	32.0	20.0	37.0	0.0
Total Split (%)	23%	35%	35%	18%	30%	30%	14%	29%	29%	18%	34%	0%
Maximum Green (s)	19.5	32.0	32.0	14.5	27.0	27.0	10.5	26.0	26.0	15.5	31.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes						
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	Max	Coord	Coord	None	Coord	Coord	None	Min	Min	None	Min	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		15.0	15.0		15.0	15.0		19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	58.2	40.7	40.7	46.7	32.7	32.7	30.8	23.1	23.1	43.8	31.6	
Actuated g/C Ratio	0.53	0.37	0.37	0.42	0.30	0.30	0.28	0.21	0.21	0.40	0.29	
v/c Ratio	0.59	0.79	0.22	0.62	0.28	0.24	0.24	0.65	0.34	0.63	0.43	
Uniform Delay, d1	15.6	31.7	19.5	15.9	30.3	10.4	21.9	39.0	21.8	22.5	31.5	
Delay	17.1	36.3	21.6	19.5	30.8	13.3	21.0	39.4	21.8	36.9	43.7	
LOS	B	D	C	B	C	B	C	D	C	D	D	
Approach Delay		29.4			24.6			34.1			41.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			C			D	
90th %ile Green (s)	19.5	32.0	32.0	14.5	27.0	27.0	10.5	26.0	26.0	15.5	31.0	
90th %ile Term Code	MaxR	Coord	Coord	Max	Coord	Coord	Max	Max	Max	Max	Hold	
70th %ile Green (s)	19.5	32.9	32.9	14.4	27.8	27.8	9.2	25.2	25.2	15.5	31.5	
70th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	19.5	39.1	39.1	11.3	30.9	30.9	8.3	22.1	22.1	15.5	29.3	
50th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	19.5	42.3	42.3	9.8	32.6	32.6	7.4	20.4	20.4	15.5	28.5	
30th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	19.5	52.1	52.1	7.5	40.1	40.1	0.0	16.6	16.6	11.8	32.9	
10th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Skip	Gap	Gap	Gap	Hold	
Queue Length 50th (m)	31.3	62.3	3.9	20.0	26.5	7.0	10.1	51.6	14.6	47.1	45.1	
Queue Length 95th (m)	61.0	#153.0	28.4	42.8	38.4	23.2	18.3	65.7	30.2	76.7	66.8	
Internal Link Dist (m)		129.8			296.0			84.0			96.0	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (m)	100.0		10.0	60.0		10.0	35.0		10.0			
50th Bay Block Time %								26%	28%			
95th Bay Block Time %		13%	50%			32%		36%	52%			
Queuing Penalty (veh)		44	112			20		23	100			

Intersection Summary

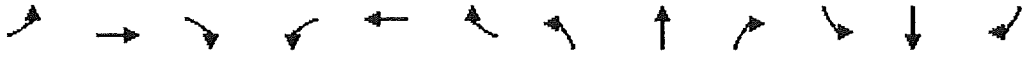
Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 35 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 31.3 Intersection LOS: C
Intersection Capacity Utilization 80.8% ICU Level of Service D
* User Entered Value
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Wye Rd & Sherwood Dr



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↱		↑↑↑		↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Turning Speed (k/h)		15	25		25	15
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	1.00
Frt		0.850				0.865
Flt Protected						
Satd. Flow (prot)	5245	1633	0	5245	0	1662
Flt Permitted						
Satd. Flow (perm)	5245	1633	0	5245	0	1662
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	60			60	60	
Link Distance (m)	111.7			61.5	38.0	
Travel Time (s)	6.7			3.7	2.3	
Volume (vph)	2100	70	0	742	0	211
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2100	70	0	742	0	211
Lane Group Flow (vph)	2100	70	0	742	0	211
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	62.0%	ICU Level of Service	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	20.0		0.0	50.0		50.0	30.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.895			0.865			0.982			0.940	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1719	0	1825	1662	0	1825	3584	0	1825	3431	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1825	1719	0	1825	1662	0	1825	3584	0	1825	3431	0
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		185.0			293.1			106.2			108.0	
Travel Time (s)		13.3			21.1			6.4			6.5	
Volume (vph)	124	19	44	18	15	134	44	388	52	219	305	203
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	124	19	44	18	15	134	44	388	52	219	305	203
Lane Group Flow (vph)	124	63	0	18	149	0	44	440	0	219	508	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 57.1%		ICU Level of Service A	



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.909			0.850		
Flt Protected	0.984					0.985
Satd. Flow (prot)	1718	0	1921	1633	0	1892
Flt Permitted	0.984					0.985
Satd. Flow (perm)	1718	0	1921	1633	0	1892
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	60		59			59
Link Distance (m)	418.3		157.0			33.9
Travel Time (s)	25.1		9.6			2.1
Volume (vph)	20	41	205	70	50	109
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	41	205	70	50	109
Lane Group Flow (vph)	61	0	205	70	0	159
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.4%		ICU Level of Service A	

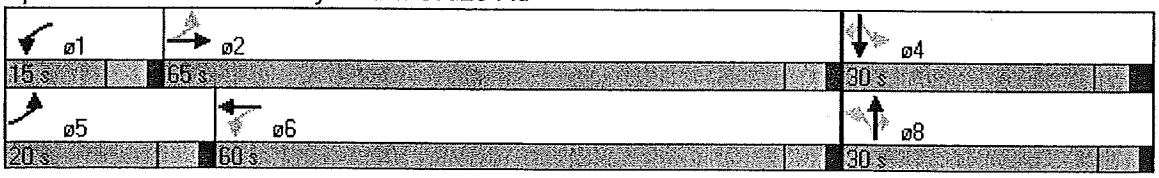
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	40.0		0.0	15.0		15.0	40.0		5.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	3.5	4.5	4.5	3.5	4.5	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	20		15	25		15
Lane Util. Factor	1.00	*0.85	0.91	1.00	*0.75	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.984				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	4874	0	1825	4253	0	1825	1921	1633	1825	1921	1633
Flt Permitted	0.250			0.071			0.728			0.725		
Satd. Flow (perm)	480	4874	0	136	4253	0	1399	1921	1633	1393	1921	1633
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			21				116			137
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		60			60			59			59	
Link Distance (m)		299.3			340.0			33.9			214.2	
Travel Time (s)		18.0			20.4			2.1			13.1	
Volume (vph)	240	2184	71	44	657	78	81	49	116	113	44	137
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	240	2184	71	44	657	78	81	49	116	113	44	137
Lane Group Flow (vph)	240	2255	0	44	735	0	81	49	116	113	44	137
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		4
Detector Phases	5			1			8	8		4	4	
Minimum Initial (s)	5.0	24.0		5.0	24.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	10.5	29.5		10.5	29.5		29.5	29.5	29.5	30.0	30.0	30.0
Total Split (s)	20.0	65.0	0.0	15.0	60.0	0.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	18%	59%	0%	14%	55%	0%	27%	27%	27%	27%	27%	27%
Maximum Green (s)	14.5	59.5		9.5	54.5		24.5	24.5	24.5	24.0	24.0	24.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	2.5	2.5	2.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?		Yes										
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	Min	Coord		None	Coord		Min	Min	Min	Min	Min	Min
Walk Time (s)		13.0			13.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		11.0			11.0		16.0	16.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		5			5		5	5	5	5	5	5
Act Effct Green (s)	82.4	71.7		76.6	66.7		18.5	18.5	18.5	18.5	18.5	18.5
Actuated g/C Ratio	0.75	0.65		0.70	0.61		0.17	0.17	0.17	0.17	0.17	0.17
v/c Ratio	0.48	0.71		0.19	0.28		0.34	0.15	0.31	0.48	0.14	0.35
Uniform Delay, d1	3.8	13.1		3.8	10.0		40.3	38.9	0.0	41.3	38.8	0.0
Delay	4.3	14.0		8.0	20.1		39.6	37.7	6.8	40.9	37.5	6.3
LOS	A	B		A	C		D	D	A	D	D	A
Approach Delay		13.0			19.4			23.8			24.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			C			C	
90th %ile Green (s)	13.5	60.3		8.7	55.5		24.5	24.5	24.5	24.0	24.0	24.0
90th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Ped	Ped	Ped
70th %ile Green (s)	10.6	67.4		7.5	64.3		18.6	18.6	18.6	18.1	18.1	18.1
70th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	9.3	70.5		6.8	68.0		16.2	16.2	16.2	15.7	15.7	15.7
50th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	8.3	71.8		6.2	69.7		15.5	15.5	15.5	15.0	15.0	15.0
30th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Min	Min	Min
10th %ile Green (s)	7.3	83.5		0.0	70.7		15.5	15.5	15.5	15.0	15.0	15.0
10th %ile Term Code	Gap	Coord		Skip	Coord		Hold	Hold	Hold	Min	Min	Min
Queue Length 50th (m)	11.2	112.6		4.6	48.0		15.8	9.3	0.0	22.7	8.3	0.0
Queue Length 95th (m)	24.9	164.3		11.6	61.8		27.8	18.4	13.7	37.2	16.7	14.9
Internal Link Dist (m)		275.3			316.0			9.9			190.2	
50th Up Block Time (%)							35%					
95th Up Block Time (%)							52%	38%	21%			
Turn Bay Length (m)	50.0			40.0			15.0		15.0	40.0		5.0
50th Bay Block Time %		20%					10%					
95th Bay Block Time %		29%			13%		39%	19%	2%			43%
Queuing Penalty (veh)		58			3		75	17	12			33

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 15.9 Intersection LOS: B
Intersection Capacity Utilization 80.9% ICU Level of Service D
* User Entered Value

Splits and Phases: 3: Wye Rd & Ordze Rd



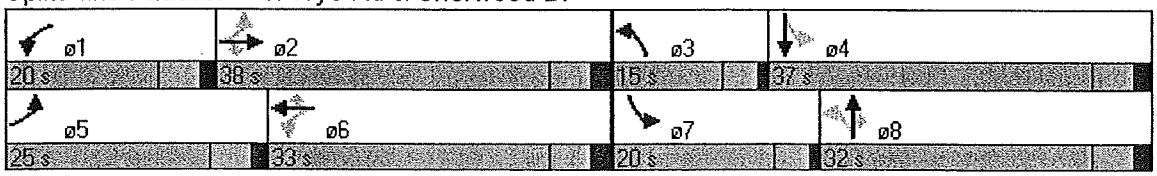
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	100.0		10.0	60.0		10.0	35.0		10.0	0.0		100.0
Storage Lanes	2		1	1		1	1		1	0		0
Total Lost Time (s)	4.5	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	3.5	5.0	5.0
Leading Detector (m)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3541	4611	1633	1825	4611	1633	1825	3650	1633	1825	3625	0
Flt Permitted	0.378			0.138			0.460			0.286		
Satd. Flow (perm)	1409	4611	1633	265	4611	1633	884	3650	1633	549	3625	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			26			84			51		5	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		153.8			320.0			108.0			120.0	
Travel Time (s)		9.2			19.2			6.5			7.2	
Volume (vph)	679	1352	137	185	384	132	75	496	132	253	428	21
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	679	1352	137	185	384	132	75	496	132	253	428	21
Lane Group Flow (vph)	679	1352	137	185	384	132	75	496	132	253	449	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phases	5		2	1		6	3	8	8	7	4	
Minimum Initial (s)	7.0	22.0	22.0	5.0	22.0	22.0	5.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	12.5	28.0	28.0	10.5	28.0	28.0	9.5	32.0	32.0	10.0	32.0	
Total Split (s)	25.0	38.0	38.0	20.0	33.0	33.0	15.0	32.0	32.0	20.0	37.0	0.0
Total Split (%)	23%	35%	35%	18%	30%	30%	14%	29%	29%	18%	34%	0%
Maximum Green (s)	19.5	32.0	32.0	14.5	27.0	27.0	10.5	26.0	26.0	15.5	31.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes						
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	Max	Coord	Coord	None	Coord	Coord	None	Min	Min	None	Min	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		15.0	15.0		15.0	15.0		19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	58.5	41.1	41.1	46.9	33.0	33.0	30.4	22.7	22.7	43.5	31.3	
Actuated g/C Ratio	0.53	0.37	0.37	0.43	0.30	0.30	0.28	0.21	0.21	0.40	0.28	
v/c Ratio	0.59	0.79	0.22	0.62	0.28	0.24	0.24	0.66	0.35	0.63	0.43	
Uniform Delay, d1	15.4	31.3	19.3	15.8	30.1	10.3	22.1	39.2	21.9	22.7	31.7	
Delay	16.9	34.9	21.5	19.4	30.6	13.2	20.4	39.3	21.4	37.4	44.5	
LOS	B	C	C	B	C	B	C	D	C	D	D	
Approach Delay		28.4			24.4			33.9			41.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			C			D	
90th %ile Green (s)	19.5	32.0	32.0	14.5	27.0	27.0	10.5	26.0	26.0	15.5	31.0	
90th %ile Term Code	MaxR	Coord	Coord	Max	Coord	Coord	Max	Max	Max	Max	Hold	
70th %ile Green (s)	19.5	33.8	33.8	14.2	28.5	28.5	9.3	24.5	24.5	15.5	30.7	
70th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	19.5	38.9	38.9	11.3	30.7	30.7	8.2	22.3	22.3	15.5	29.6	
50th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	19.5	43.5	43.5	9.7	33.7	33.7	7.3	19.3	19.3	15.5	27.5	
30th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	19.5	52.2	52.2	7.5	40.2	40.2	0.0	16.4	16.4	11.9	32.8	
10th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Skip	Gap	Gap	Gap	Hold	
Queue Length 50th (m)	31.3	63.2	3.9	20.1	26.6	7.0	9.8	53.4	0.0	46.9	44.5	
Queue Length 95th (m)	61.0	#153.0	28.4	42.8	38.4	23.2	17.4	69.2	26.9	76.7	66.8	
Internal Link Dist (m)		129.8			296.0			84.0			96.0	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (m)	100.0		10.0	60.0		10.0	35.0		10.0			
50th Bay Block Time %								24%	10%			
95th Bay Block Time %		13%	50%			32%		37%	29%			
Queuing Penalty (veh)		44	112			20		23	48			

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 35 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 30.9 Intersection LOS: C
Intersection Capacity Utilization 80.8% ICU Level of Service D
* User Entered Value
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Wye Rd & Sherwood Dr





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↱		↑↑↑		↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Turning Speed (k/h)		15	25		25	15
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	1.00
Frt		0.850				0.865
Flt Protected						
Satd. Flow (prot)	5245	1633	0	5245	0	1662
Flt Permitted						
Satd. Flow (perm)	5245	1633	0	5245	0	1662
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	60			60	60	
Link Distance (m)	76.3			96.9	39.2	
Travel Time (s)	4.6			5.8	2.4	
Volume (vph)	2100	70	0	750	0	211
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2100	70	0	750	0	211
Lane Group Flow (vph)	2100	70	0	750	0	211
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 62.0% ICU Level of Service B



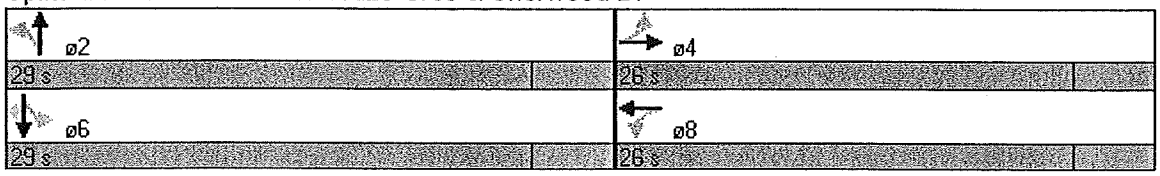
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	20.0		0.0	50.0		50.0	30.0		30.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.895			0.865			0.982				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1719	0	1825	1662	0	1825	3584	0	1825	3650	1633
Flt Permitted	0.662			0.716			0.566			0.497		
Satd. Flow (perm)	1272	1719	0	1376	1662	0	1087	3584	0	955	3650	1633
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		44			134			34				203
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		216.0			293.1			106.2			108.0	
Travel Time (s)		15.6			21.1			6.4			6.5	
Volume (vph)	124	19	44	18	15	134	44	388	52	219	305	203
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	124	19	44	18	15	134	44	388	52	219	305	203
Lane Group Flow (vph)	124	63	0	18	149	0	44	440	0	219	305	203
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phases	4	4		8	8		2	2		6	6	6
Minimum Initial (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Minimum Split (s)	26.0	26.0		26.0	26.0		26.0	26.0		26.0	26.0	26.0
Total Split (s)	26.0	26.0	0.0	26.0	26.0	0.0	29.0	29.0	0.0	29.0	29.0	29.0
Total Split (%)	47%	47%	0%	47%	47%	0%	53%	53%	0%	53%	53%	53%
Maximum Green (s)	22.0	22.0		22.0	22.0		25.0	25.0		25.0	25.0	25.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Recall Mode	None	None		None	None		Coord	Coord		Coord	Coord	Coord
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	14.3	14.3		14.3	14.3		35.5	35.5		35.5	35.5	35.5
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.65	0.65		0.65	0.65	0.65
v/c Ratio	0.37	0.13		0.05	0.28		0.06	0.19		0.36	0.13	0.18
Uniform Delay, d1	19.2	5.3		17.6	1.8		4.3	4.3		5.3	4.5	0.0
Delay	16.7	6.5		15.2	4.7		6.0	5.3		4.2	3.3	0.8
LOS	B	A		B	A		A	A		A	A	A
Approach Delay		13.3			5.9			5.4			2.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			A			A	
90th %ile Green (s)	16.5	16.5		16.5	16.5		30.5	30.5		30.5	30.5	30.5
90th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord		Coord	Coord	Coord
70th %ile Green (s)	15.0	15.0		15.0	15.0		32.0	32.0		32.0	32.0	32.0
70th %ile Term Code	Min	Min		Min	Min		Coord	Coord		Coord	Coord	Coord
50th %ile Green (s)	15.0	15.0		15.0	15.0		32.0	32.0		32.0	32.0	32.0
50th %ile Term Code	Min	Min		Min	Min		Coord	Coord		Coord	Coord	Coord
30th %ile Green (s)	15.0	15.0		15.0	15.0		32.0	32.0		32.0	32.0	32.0
30th %ile Term Code	Min	Min		Min	Min		Coord	Coord		Coord	Coord	Coord
10th %ile Green (s)	0.0	0.0		0.0	0.0		51.0	51.0		51.0	51.0	51.0
10th %ile Term Code	Skip	Skip		Skip	Skip		Coord	Coord		Coord	Coord	Coord
Queue Length 50th (m)	10.6	0.0		1.4	0.6		1.8	9.1		10.7	7.5	0.0
Queue Length 95th (m)	m18.7	m0.0		5.0	7.8		5.5	16.0		14.7	6.4	4.3
Internal Link Dist (m)		192.0			269.1			82.2			84.0	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (m)	50.0			20.0			50.0			30.0		30.0
50th Bay Block Time %												
95th Bay Block Time %												
Queuing Penalty (veh)												

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 55
Offset: 34 (62%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.37
Intersection Signal Delay: 5.2 Intersection LOS: A
Intersection Capacity Utilization 66.7% ICU Level of Service B
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 193: Ordze Cres & Sherwood Dr



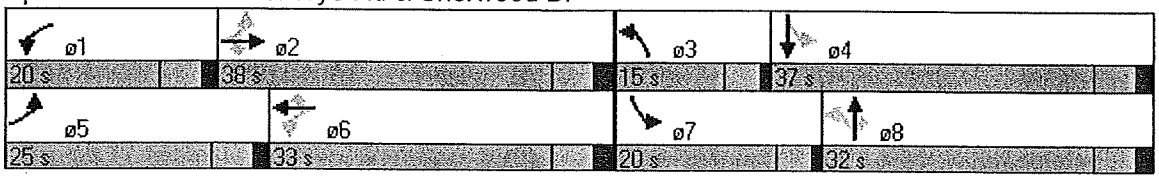
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	100.0		10.0	60.0		10.0	35.0		10.0	0.0		100.0
Storage Lanes	2		1	1		1	1		1	0		0
Total Lost Time (s)	4.5	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	3.5	5.0	5.0
Leading Detector (m)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3541	4611	1633	1825	4611	1633	1825	3650	1633	1825	3625	0
Flt Permitted	0.378			0.138			0.460			0.286		
Satd. Flow (perm)	1409	4611	1633	265	4611	1633	884	3650	1633	549	3625	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			29			84			51		5	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		153.8			320.0			108.0			120.0	
Travel Time (s)		9.2			19.2			6.5			7.2	
Volume (vph)	767	1375	156	185	384	132	134	496	132	253	428	21
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	767	1375	156	185	384	132	134	496	132	253	428	21
Lane Group Flow (vph)	767	1375	156	185	384	132	134	496	132	253	449	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phases	5		2	1		6	3	8	8	7	4	
Minimum Initial (s)	7.0	22.0	22.0	5.0	22.0	22.0	5.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	12.5	28.0	28.0	10.5	28.0	28.0	9.5	32.0	32.0	10.0	32.0	
Total Split (s)	25.0	38.0	38.0	20.0	33.0	33.0	15.0	32.0	32.0	20.0	37.0	0.0
Total Split (%)	23%	35%	35%	18%	30%	30%	14%	29%	29%	18%	34%	0%
Maximum Green (s)	19.5	32.0	32.0	14.5	27.0	27.0	10.5	26.0	26.0	15.5	31.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes						
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	Max	Coord	Coord	None	Coord	Coord	None	Min	Min	None	Min	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		15.0	15.0		15.0	15.0		19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	58.2	40.7	40.7	46.7	32.7	32.7	32.3	23.1	23.1	43.8	28.1	
Actuated g/C Ratio	0.53	0.37	0.37	0.42	0.30	0.30	0.29	0.21	0.21	0.40	0.26	
v/c Ratio	0.67	0.81	0.25	0.62	0.28	0.24	0.40	0.65	0.34	0.63	0.48	
Uniform Delay, d1	15.6	31.2	19.3	15.5	29.7	10.2	22.9	39.7	22.2	23.0	34.3	
Delay	18.6	38.8	22.6	19.5	30.8	13.3	22.1	39.4	21.8	36.9	45.8	
LOS	B	D	C	B	C	B	C	D	C	D	D	
Approach Delay		30.9			24.6			33.3			42.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			C			D	
90th %ile Green (s)	19.5	32.0	32.0	14.5	27.0	27.0	10.5	26.0	26.0	15.5	31.0	
90th %ile Term Code	MaxR	Coord	Coord	Max	Coord	Coord	Max	Max	Max	Max	Hold	
70th %ile Green (s)	19.5	32.9	32.9	14.4	27.8	27.8	10.5	25.2	25.2	15.5	30.2	
70th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Max	Gap	Gap	Max	Hold	
50th %ile Green (s)	19.5	39.1	39.1	11.3	30.9	30.9	10.5	22.1	22.1	15.5	27.1	
50th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Max	Gap	Gap	Max	Hold	
30th %ile Green (s)	19.5	42.3	42.3	9.8	32.6	32.6	9.4	20.4	20.4	15.5	26.5	
30th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	19.5	52.1	52.1	7.5	40.1	40.1	7.6	16.6	16.6	11.8	20.8	
10th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Gap	Hold	
Queue Length 50th (m)	37.9	69.7	8.1	20.0	26.5	7.0	18.6	51.6	14.6	47.1	45.1	
Queue Length 95th (m)	70.8	#157.9	33.0	42.8	38.4	23.2	30.0	65.7	30.2	76.6	66.8	
Internal Link Dist (m)		129.8			296.0			84.0			96.0	
50th Up Block Time (%)												
95th Up Block Time (%)		4%										
Turn Bay Length (m)	100.0		10.0	60.0		10.0	35.0		10.0			
50th Bay Block Time %			17%					26%	28%			
95th Bay Block Time %		15%	53%			32%		36%	52%			
Queuing Penalty (veh)		83	162			20		41	100			

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 35 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 32.2 Intersection LOS: C
Intersection Capacity Utilization 83.4% ICU Level of Service D
* User Entered Value
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Wye Rd & Sherwood Dr





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.901			0.850		
Flt Protected	0.987					0.976
Satd. Flow (prot)	1708	0	1921	1633	0	1875
Flt Permitted	0.987					0.976
Satd. Flow (perm)	1708	0	1921	1633	0	1875
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	60		59			59
Link Distance (m)	453.3		157.0			33.9
Travel Time (s)	27.2		9.6			2.1
Volume (vph)	20	54	205	70	109	109
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	54	205	70	109	109
Lane Group Flow (vph)	74	0	205	70	0	218
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.5%		ICU Level of Service A	



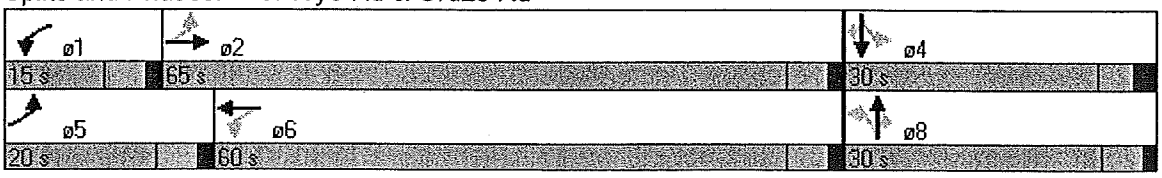
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	40.0		0.0	15.0		15.0	40.0		5.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	3.5	4.5	4.5	3.5	4.5	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	20		15	25		15
Lane Util. Factor	1.00	*0.85	0.91	1.00	*0.75	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.984				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	4874	0	1825	4253	0	1825	1921	1633	1825	1921	1633
Flt Permitted	0.250			0.071			0.728			0.725		
Satd. Flow (perm)	480	4874	0	136	4253	0	1399	1921	1633	1393	1921	1633
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			21				116			137
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		60			60			59			59	
Link Distance (m)		299.3			340.0			33.9			214.2	
Travel Time (s)		18.0			20.4			2.1			13.1	
Volume (vph)	240	2184	71	103	657	78	94	49	116	113	44	137
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	240	2184	71	103	657	78	94	49	116	113	44	137
Lane Group Flow (vph)	240	2255	0	103	735	0	94	49	116	113	44	137
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		4
Detector Phases	5			1			8	8		4	4	
Minimum Initial (s)	5.0	24.0		5.0	24.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	10.5	29.5		10.5	29.5		29.5	29.5	29.5	30.0	30.0	30.0
Total Split (s)	20.0	65.0	0.0	15.0	60.0	0.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	18%	59%	0%	14%	55%	0%	27%	27%	27%	27%	27%	27%
Maximum Green (s)	14.5	59.5		9.5	54.5		24.5	24.5	24.5	24.0	24.0	24.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	2.5	2.5	2.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?		Yes										
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	Min	Coord		None	Coord		Min	Min	Min	Min	Min	Min
Walk Time (s)		13.0			13.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		11.0			11.0		16.0	16.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		5			5		5	5	5	5	5	5
Act Effct Green (s)	80.9	68.2		77.9	66.7		18.5	18.5	18.5	18.5	18.5	18.5
Actuated g/C Ratio	0.74	0.62		0.71	0.61		0.17	0.17	0.17	0.17	0.17	0.17
v/c Ratio	0.48	0.75		0.41	0.28		0.40	0.15	0.31	0.48	0.14	0.35
Uniform Delay, d1	3.9	14.7		4.0	10.0		40.7	38.9	0.0	41.3	38.8	0.0
Delay	4.3	15.8		10.8	18.2		40.1	37.7	6.8	40.9	37.5	6.3
LOS	A	B		B	B		D	D	A	D	D	A
Approach Delay		14.7			17.3			24.8			24.3	

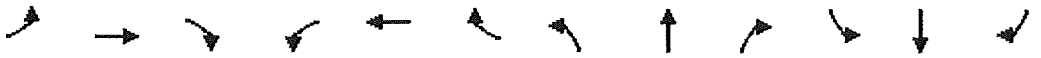
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			C			C	
90th %ile Green (s)	13.5	59.5		9.5	55.5		24.5	24.5	24.5	24.0	24.0	24.0
90th %ile Term Code	Gap	Coord		Max	Coord		Hold	Hold	Hold	Ped	Ped	Ped
70th %ile Green (s)	10.6	65.4		9.5	64.3		18.6	18.6	18.6	18.1	18.1	18.1
70th %ile Term Code	Gap	Coord		Max	Coord		Hold	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	9.3	68.9		8.4	68.0		16.2	16.2	16.2	15.7	15.7	15.7
50th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	8.3	70.5		7.5	69.7		15.5	15.5	15.5	15.0	15.0	15.0
30th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Min	Min	Min
10th %ile Green (s)	7.3	71.7		6.3	70.7		15.5	15.5	15.5	15.0	15.0	15.0
10th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Min	Min	Min
Queue Length 50th (m)	11.2	118.2		10.2	44.4		18.6	9.3	0.0	22.7	8.3	0.0
Queue Length 95th (m)	24.9	164.3		24.1	57.7		31.7	18.4	13.7	37.2	16.7	14.9
Internal Link Dist (m)		275.3			316.0			9.9			190.2	
50th Up Block Time (%)							42%					
95th Up Block Time (%)							55%	38%	21%			
Turn Bay Length (m)	50.0			40.0			15.0		15.0	40.0		5.0
50th Bay Block Time %		21%					21%					
95th Bay Block Time %		29%			10%		43%	19%	2%			43%
Queuing Penalty (veh)		60			5		98	18	12			33

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 16.6 Intersection LOS: B
Intersection Capacity Utilization 80.9% ICU Level of Service D
* User Entered Value

Splits and Phases: 3: Wye Rd & Ordze Rd





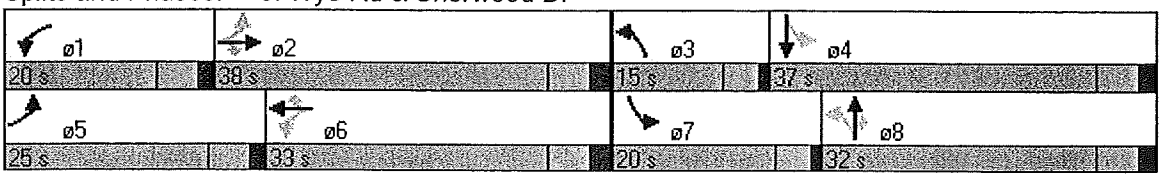
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	100.0		10.0	60.0		10.0	35.0		10.0	0.0		100.0
Storage Lanes	2		1	1		1	1		1	0		0
Total Lost Time (s)	4.5	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	3.5	5.0	5.0
Leading Detector (m)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3541	4611	1633	1825	4611	1633	1825	3650	1633	1825	3625	0
Flt Permitted	0.378			0.138			0.460			0.286		
Satd. Flow (perm)	1409	4611	1633	265	4611	1633	884	3650	1633	549	3625	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			29			84			51		5	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		153.8			320.0			108.0			120.0	
Travel Time (s)		9.2			19.2			6.5			7.2	
Volume (vph)	767	1375	156	185	384	132	134	496	132	253	428	21
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	767	1375	156	185	384	132	134	496	132	253	428	21
Lane Group Flow (vph)	767	1375	156	185	384	132	134	496	132	253	449	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phases	5		2	1		6	3	8	8	7	4	
Minimum Initial (s)	7.0	22.0	22.0	5.0	22.0	22.0	5.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	12.5	28.0	28.0	10.5	28.0	28.0	9.5	32.0	32.0	10.0	32.0	
Total Split (s)	25.0	38.0	38.0	20.0	33.0	33.0	15.0	32.0	32.0	20.0	37.0	0.0
Total Split (%)	23%	35%	35%	18%	30%	30%	14%	29%	29%	18%	34%	0%
Maximum Green (s)	19.5	32.0	32.0	14.5	27.0	27.0	10.5	26.0	26.0	15.5	31.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes						
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	Max	Coord	Coord	None	Coord	Coord	None	Min	Min	None	Min	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		15.0	15.0		15.0	15.0		19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	58.2	40.7	40.7	46.7	32.7	32.7	32.3	23.1	23.1	43.8	28.1	
Actuated g/C Ratio	0.53	0.37	0.37	0.42	0.30	0.30	0.29	0.21	0.21	0.40	0.26	
v/c Ratio	0.67	0.81	0.25	0.62	0.28	0.24	0.40	0.65	0.34	0.63	0.48	
Uniform Delay, d1	15.6	31.2	19.3	15.5	29.7	10.2	22.9	39.7	22.2	23.0	34.3	
Delay	18.6	38.8	22.6	19.5	30.8	13.3	22.1	39.4	21.8	36.9	45.8	
LOS	B	D	C	B	C	B	C	D	C	D	D	
Approach Delay		30.9			24.6			33.3			42.6	

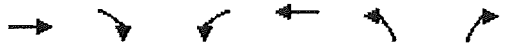
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			C			D	
90th %ile Green (s)	19.5	32.0	32.0	14.5	27.0	27.0	10.5	26.0	26.0	15.5	31.0	
90th %ile Term Code	MaxR	Coord	Coord	Max	Coord	Coord	Max	Max	Max	Max	Hold	
70th %ile Green (s)	19.5	32.9	32.9	14.4	27.8	27.8	10.5	25.2	25.2	15.5	30.2	
70th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Max	Gap	Gap	Max	Hold	
50th %ile Green (s)	19.5	39.1	39.1	11.3	30.9	30.9	10.5	22.1	22.1	15.5	27.1	
50th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Max	Gap	Gap	Max	Hold	
30th %ile Green (s)	19.5	42.3	42.3	9.8	32.6	32.6	9.4	20.4	20.4	15.5	26.5	
30th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	19.5	52.1	52.1	7.5	40.1	40.1	7.6	16.6	16.6	11.8	20.8	
10th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Gap	Hold	
Queue Length 50th (m)	37.9	69.7	8.1	20.0	26.5	7.0	18.6	51.6	14.6	47.1	45.1	
Queue Length 95th (m)	70.8	#157.9	33.0	42.8	38.4	23.2	30.0	65.7	30.2	76.6	66.8	
Internal Link Dist (m)		129.8			296.0			84.0			96.0	
50th Up Block Time (%)												
95th Up Block Time (%)		4%										
Turn Bay Length (m)	100.0		10.0	60.0		10.0	35.0		10.0			
50th Bay Block Time %			17%					26%	28%			
95th Bay Block Time %		15%	53%			32%		36%	52%			
Queuing Penalty (veh)		83	162			20		41	100			

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 35 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 32.2 Intersection LOS: C
Intersection Capacity Utilization 83.4% ICU Level of Service D
* User Entered Value
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

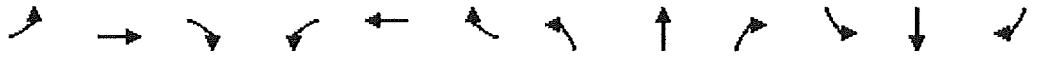
Splits and Phases: 6: Wye Rd & Sherwood Dr





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↱		↑↑↑		↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		50.0	0.0		0.0	0.0
Storage Lanes		1	0		0	1
Turning Speed (k/h)		15	25		25	15
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	1.00
Frt		0.850				0.865
Flt Protected						
Satd. Flow (prot)	5245	1633	0	5245	0	1662
Flt Permitted						
Satd. Flow (perm)	5245	1633	0	5245	0	1662
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	60			60	60	
Link Distance (m)	110.7			62.5	38.7	
Travel Time (s)	6.6			3.8	2.3	
Volume (vph)	2100	70	0	820	0	341
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2100	70	0	820	0	341
Lane Group Flow (vph)	2100	70	0	820	0	341
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 70.0%		ICU Level of Service C	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	20.0		0.0	50.0		50.0	30.0		0.0
Storage Lanes	0		1	1		1	0		1	1		1
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt			0.865			0.850		0.984				0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	0	1662	1825	0	1633	0	3592	0	1825	1921	1633
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	0	1662	1825	0	1633	0	3592	0	1825	1921	1633
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		216.0			293.1			106.2			108.0	
Travel Time (s)		15.6			21.1			6.4			6.5	
Volume (vph)	0	0	44	18	0	149	0	432	52	238	305	203
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	44	18	0	149	0	432	52	238	305	203
Lane Group Flow (vph)	0	0	44	18	0	149	0	484	0	238	305	203
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 42.6%		ICU Level of Service A	



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.901		0.966			
Flt Protected	0.987					0.985
Satd. Flow (prot)	1708	0	1856	0	0	1892
Flt Permitted	0.987					0.985
Satd. Flow (perm)	1708	0	1856	0	0	1892
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	60		59			59
Link Distance (m)	453.3		157.0			33.9
Travel Time (s)	27.2		9.6			2.1
Volume (vph)	20	54	205	70	50	109
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	54	205	70	50	109
Lane Group Flow (vph)	74	0	275	0	0	159
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 40.5%		ICU Level of Service A	

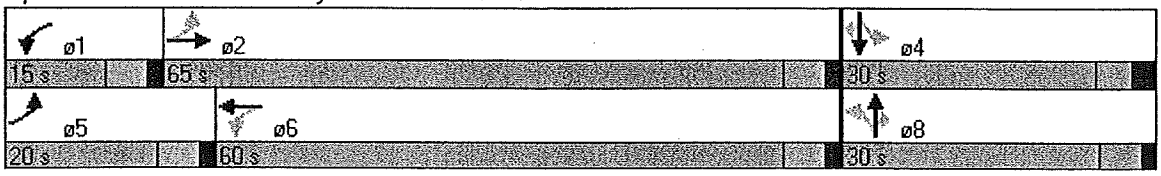
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	40.0		0.0	15.0		15.0	40.0		5.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	3.5	4.5	4.5	3.5	4.5	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	20		15	25		15
Lane Util. Factor	1.00	*0.85	0.91	1.00	*0.75	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.984				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	4874	0	1825	4253	0	1825	1921	1633	1825	1921	1633
Flt Permitted	0.250			0.071			0.728			0.725		
Satd. Flow (perm)	480	4874	0	136	4253	0	1399	1921	1633	1393	1921	1633
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			21				116			137
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		60			60			59			59	
Link Distance (m)		299.3			340.0			33.9			214.2	
Travel Time (s)		18.0			20.4			2.1			13.1	
Volume (vph)	240	2184	71	44	657	78	94	49	116	113	44	137
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	240	2184	71	44	657	78	94	49	116	113	44	137
Lane Group Flow (vph)	240	2255	0	44	735	0	94	49	116	113	44	137
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		4
Detector Phases	5			1			8	8		4	4	
Minimum Initial (s)	5.0	24.0		5.0	24.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	10.5	29.5		10.5	29.5		29.5	29.5	29.5	30.0	30.0	30.0
Total Split (s)	20.0	65.0	0.0	15.0	60.0	0.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	18%	59%	0%	14%	55%	0%	27%	27%	27%	27%	27%	27%
Maximum Green (s)	14.5	59.5		9.5	54.5		24.5	24.5	24.5	24.0	24.0	24.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	2.5	2.5	2.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?		Yes										
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	Min	Coord		None	Coord		Min	Min	Min	Min	Min	Min
Walk Time (s)		13.0			13.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		11.0			11.0		16.0	16.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		5			5		5	5	5	5	5	5
Act Effct Green (s)	82.4	71.7		76.6	66.7		18.5	18.5	18.5	18.5	18.5	18.5
Actuated g/C Ratio	0.75	0.65		0.70	0.61		0.17	0.17	0.17	0.17	0.17	0.17
v/c Ratio	0.48	0.71		0.19	0.28		0.40	0.15	0.31	0.48	0.14	0.35
Uniform Delay, d1	3.8	13.1		3.8	10.0		40.7	38.9	0.0	41.3	38.8	0.0
Delay	4.3	14.0		7.9	19.9		40.1	37.7	6.8	40.9	37.5	6.3
LOS	A	B		A	B		D	D	A	D	D	A
Approach Delay		13.0			19.3			24.8			24.3	

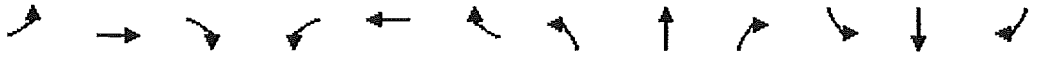
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			C			C	
90th %ile Green (s)	13.5	60.3		8.7	55.5		24.5	24.5	24.5	24.0	24.0	24.0
90th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Ped	Ped	Ped
70th %ile Green (s)	10.6	67.4		7.5	64.3		18.6	18.6	18.6	18.1	18.1	18.1
70th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	9.3	70.5		6.8	68.0		16.2	16.2	16.2	15.7	15.7	15.7
50th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	8.3	71.8		6.2	69.7		15.5	15.5	15.5	15.0	15.0	15.0
30th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Min	Min	Min
10th %ile Green (s)	7.3	83.5		0.0	70.7		15.5	15.5	15.5	15.0	15.0	15.0
10th %ile Term Code	Gap	Coord		Skip	Coord		Hold	Hold	Hold	Min	Min	Min
Queue Length 50th (m)	11.2	112.6		4.6	48.1		18.6	9.3	0.0	22.7	8.3	0.0
Queue Length 95th (m)	24.9	164.3		11.5	61.5		31.7	18.4	13.7	37.2	16.7	14.9
Internal Link Dist (m)		275.3			316.0			9.9			190.2	
50th Up Block Time (%)							42%					
95th Up Block Time (%)							55%	38%	21%			
Turn Bay Length (m)	50.0			40.0			15.0		15.0	40.0		5.0
50th Bay Block Time %		20%					21%					
95th Bay Block Time %		29%			13%		43%	19%	2%			43%
Queuing Penalty (veh)		58			3		98	18	12			33

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 16.0 Intersection LOS: B
Intersection Capacity Utilization 80.9% ICU Level of Service D
* User Entered Value

Splits and Phases: 3: Wye Rd & Ordze Rd





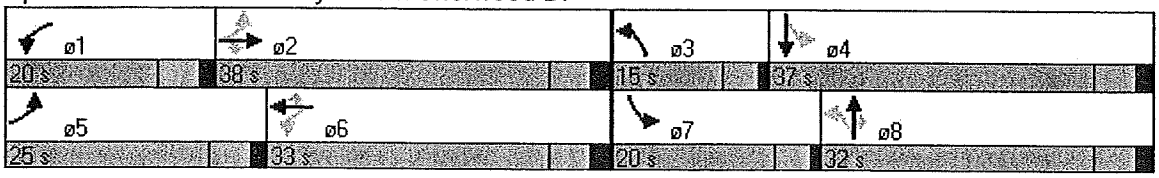
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	100.0		10.0	60.0		10.0	35.0		10.0	0.0		100.0
Storage Lanes	2		1	1		1	1		1	0		0
Total Lost Time (s)	4.5	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	3.5	5.0	5.0
Leading Detector (m)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3541	4611	1633	1825	4611	1633	1825	3650	1633	1825	3625	0
Flt Permitted	0.378			0.138			0.460			0.286		
Satd. Flow (perm)	1409	4611	1633	265	4611	1633	884	3650	1633	549	3625	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			29			84			51		5	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		153.8			320.0			108.0			120.0	
Travel Time (s)		9.2			19.2			6.5			7.2	
Volume (vph)	767	1375	156	185	384	132	75	496	132	253	428	21
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	767	1375	156	185	384	132	75	496	132	253	428	21
Lane Group Flow (vph)	767	1375	156	185	384	132	75	496	132	253	449	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phases	5		2	1		6	3	8	8	7	4	
Minimum Initial (s)	7.0	22.0	22.0	5.0	22.0	22.0	5.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	12.5	28.0	28.0	10.5	28.0	28.0	9.5	32.0	32.0	10.0	32.0	
Total Split (s)	25.0	38.0	38.0	20.0	33.0	33.0	15.0	32.0	32.0	20.0	37.0	0.0
Total Split (%)	23%	35%	35%	18%	30%	30%	14%	29%	29%	18%	34%	0%
Maximum Green (s)	19.5	32.0	32.0	14.5	27.0	27.0	10.5	26.0	26.0	15.5	31.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes						
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	Max	Coord	Coord	None	Coord	Coord	None	Min	Min	None	Min	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		15.0	15.0		15.0	15.0		19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	58.2	40.7	40.7	46.7	32.7	32.7	30.8	23.1	23.1	43.8	31.6	
Actuated g/C Ratio	0.53	0.37	0.37	0.42	0.30	0.30	0.28	0.21	0.21	0.40	0.29	
v/c Ratio	0.67	0.81	0.25	0.62	0.28	0.24	0.24	0.65	0.34	0.63	0.43	
Uniform Delay, d1	16.1	31.9	19.8	15.9	30.3	10.4	21.9	39.0	21.8	22.5	31.5	
Delay	18.5	38.0	21.6	19.5	30.8	13.3	21.0	39.4	21.8	36.9	43.7	
LOS	B	D	C	B	C	B	C	D	C	D	D	
Approach Delay		30.4			24.6			34.1			41.3	

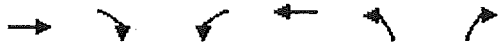
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			C			D	
90th %ile Green (s)	19.5	32.0	32.0	14.5	27.0	27.0	10.5	26.0	26.0	15.5	31.0	
90th %ile Term Code	MaxR	Coord	Coord	Max	Coord	Coord	Max	Max	Max	Max	Hold	
70th %ile Green (s)	19.5	32.9	32.9	14.4	27.8	27.8	9.2	25.2	25.2	15.5	31.5	
70th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	19.5	39.1	39.1	11.3	30.9	30.9	8.3	22.1	22.1	15.5	29.3	
50th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	19.5	42.3	42.3	9.8	32.6	32.6	7.4	20.4	20.4	15.5	28.5	
30th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	19.5	52.1	52.1	7.5	40.1	40.1	0.0	16.6	16.6	11.8	32.9	
10th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Skip	Gap	Gap	Gap	Hold	
Queue Length 50th (m)	36.1	68.2	5.3	20.0	26.5	7.0	10.1	51.6	14.6	47.1	45.1	
Queue Length 95th (m)	70.5	#157.6	32.1	42.8	38.4	23.2	18.3	65.7	30.2	76.6	66.8	
Internal Link Dist (m)		129.8			296.0			84.0			96.0	
50th Up Block Time (%)												
95th Up Block Time (%)		4%										
Turn Bay Length (m)	100.0		10.0	60.0		10.0	35.0		10.0			
50th Bay Block Time %			7%					26%	28%			
95th Bay Block Time %		15%	52%			32%		36%	52%			
Queuing Penalty (veh)		82	134			20		23	100			

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 35 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 31.8 Intersection LOS: C
Intersection Capacity Utilization 83.4% ICU Level of Service D
* User Entered Value
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

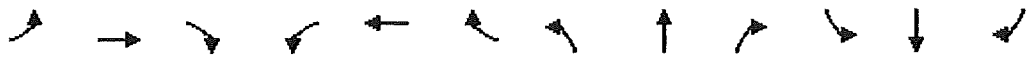
Splits and Phases: 6: Wye Rd & Sherwood Dr





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↱		↑↑↑		↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		50.0	0.0		0.0	0.0
Storage Lanes		1	0		0	1
Turning Speed (k/h)		15	25		25	15
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	1.00
Frt		0.850				0.865
Flt Protected						
Satd. Flow (prot)	5245	1633	0	5245	0	1662
Flt Permitted						
Satd. Flow (perm)	5245	1633	0	5245	0	1662
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	60			60	60	
Link Distance (m)	110.7			62.5	38.7	
Travel Time (s)	6.6			3.8	2.3	
Volume (vph)	2100	70	0	750	0	341
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2100	70	0	750	0	341
Lane Group Flow (vph)	2100	70	0	750	0	341
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	70.0%	ICU Level of Service	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	20.0		0.0	50.0		50.0	30.0		0.0
Storage Lanes	0		1	1		0	1		1	1		1
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt			0.865		0.865			0.982				0.850
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	0	0	1662	1825	1662	0	1825	3584	0	1825	1921	1633
Flt Permitted				0.950			0.950			0.950		
Satd. Flow (perm)	0	0	1662	1825	1662	0	1825	3584	0	1825	1921	1633
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		216.0			293.1			106.2			108.0	
Travel Time (s)		15.6			21.1			6.4			6.5	
Volume (vph)	0	0	44	18	15	134	44	388	52	238	305	203
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	44	18	15	134	44	388	52	238	305	203
Lane Group Flow (vph)	0	0	44	18	149	0	44	440	0	238	305	203
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 47.1%		ICU Level of Service A	



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.909		0.966			
Flt Protected	0.984					0.985
Satd. Flow (prot)	1718	0	1856	0	0	1892
Flt Permitted	0.984					0.985
Satd. Flow (perm)	1718	0	1856	0	0	1892
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	60		59			59
Link Distance (m)	418.3		157.0			33.9
Travel Time (s)	25.1		9.6			2.1
Volume (vph)	20	41	205	70	50	109
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	41	205	70	50	109
Lane Group Flow (vph)	61	0	275	0	0	159
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.7%		ICU Level of Service A	

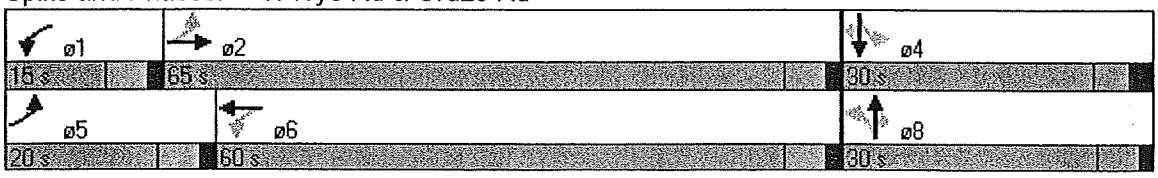
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	40.0		0.0	15.0		15.0	40.0		5.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	3.5	4.5	4.5	3.5	4.5	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	20		15	25		15
Lane Util. Factor	1.00	*0.85	0.91	1.00	*0.75	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.984				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	4874	0	1825	4253	0	1825	1921	1633	1825	1921	1633
Flt Permitted	0.250			0.071			0.728			0.725		
Satd. Flow (perm)	480	4874	0	136	4253	0	1399	1921	1633	1393	1921	1633
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			21				116			137
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		60			60			59			59	
Link Distance (m)		299.3			340.0			33.9			214.2	
Travel Time (s)		18.0			20.4			2.1			13.1	
Volume (vph)	240	2184	71	44	657	78	81	49	116	113	44	137
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	240	2184	71	44	657	78	81	49	116	113	44	137
Lane Group Flow (vph)	240	2255	0	44	735	0	81	49	116	113	44	137
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		4
Detector Phases	5			1			8	8		4	4	
Minimum Initial (s)	5.0	24.0		5.0	24.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	10.5	29.5		10.5	29.5		29.5	29.5	29.5	30.0	30.0	30.0
Total Split (s)	20.0	65.0	0.0	15.0	60.0	0.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	18%	59%	0%	14%	55%	0%	27%	27%	27%	27%	27%	27%
Maximum Green (s)	14.5	59.5		9.5	54.5		24.5	24.5	24.5	24.0	24.0	24.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	2.5	2.5	2.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?		Yes										
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	Min	Coord		None	Coord		Min	Min	Min	Min	Min	Min
Walk Time (s)		13.0			13.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		11.0			11.0		16.0	16.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		5			5		5	5	5	5	5	5
Act Effct Green (s)	82.4	71.7		76.6	66.7		18.5	18.5	18.5	18.5	18.5	18.5
Actuated g/C Ratio	0.75	0.65		0.70	0.61		0.17	0.17	0.17	0.17	0.17	0.17
v/c Ratio	0.48	0.71		0.19	0.28		0.34	0.15	0.31	0.48	0.14	0.35
Uniform Delay, d1	3.8	13.1		3.8	10.0		40.3	38.9	0.0	41.3	38.8	0.0
Delay	4.3	14.0		7.9	19.9		39.6	37.7	6.8	40.9	37.5	6.3
LOS	A	B		A	B		D	D	A	D	D	A
Approach Delay		13.0			19.3			23.8			24.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			C			C	
90th %ile Green (s)	13.5	60.3		8.7	55.5		24.5	24.5	24.5	24.0	24.0	24.0
90th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Ped	Ped	Ped
70th %ile Green (s)	10.6	67.4		7.5	64.3		18.6	18.6	18.6	18.1	18.1	18.1
70th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	9.3	70.5		6.8	68.0		16.2	16.2	16.2	15.7	15.7	15.7
50th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	8.3	71.8		6.2	69.7		15.5	15.5	15.5	15.0	15.0	15.0
30th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Min	Min	Min
10th %ile Green (s)	7.3	83.5		0.0	70.7		15.5	15.5	15.5	15.0	15.0	15.0
10th %ile Term Code	Gap	Coord		Skip	Coord		Hold	Hold	Hold	Min	Min	Min
Queue Length 50th (m)	11.2	112.6		4.6	48.1		15.8	9.3	0.0	22.7	8.3	0.0
Queue Length 95th (m)	24.9	164.3		11.5	61.5		27.8	18.4	13.7	37.2	16.7	14.9
Internal Link Dist (m)		275.3			316.0			9.9			190.2	
50th Up Block Time (%)							35%					
95th Up Block Time (%)							52%	38%	21%			
Turn Bay Length (m)	50.0			40.0			15.0		15.0	40.0		5.0
50th Bay Block Time %		20%					10%					
95th Bay Block Time %		29%			13%		39%	19%	2%			43%
Queuing Penalty (veh)		58			3		75	17	12			33

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 15.9 Intersection LOS: B
Intersection Capacity Utilization 80.9% ICU Level of Service D
* User Entered Value

Splits and Phases: 3: Wye Rd & Ordze Rd



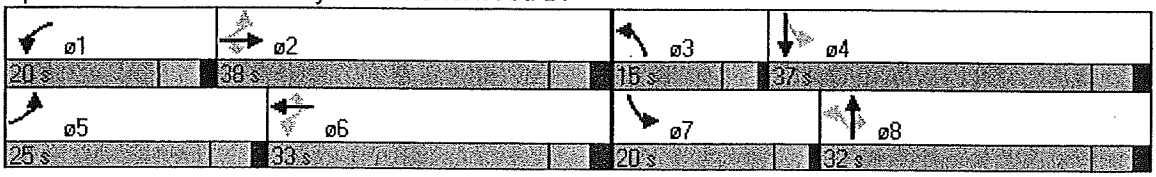
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	100.0		10.0	60.0		10.0	35.0		10.0	0.0		100.0
Storage Lanes	2		1	1		1	1		1	0		0
Total Lost Time (s)	4.5	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	3.5	5.0	5.0
Leading Detector (m)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3541	4611	1633	1825	4611	1633	1825	3650	1633	1825	3625	0
Flt Permitted	0.378			0.138			0.460			0.286		
Satd. Flow (perm)	1409	4611	1633	265	4611	1633	884	3650	1633	549	3625	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			26			84			51		5	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		153.8			160.7			108.0			120.0	
Travel Time (s)		9.2			9.6			6.5			7.2	
Volume (vph)	679	1352	137	95	384	132	75	496	132	253	428	21
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	679	1352	137	95	384	132	75	496	132	253	428	21
Lane Group Flow (vph)	679	1352	137	95	384	132	75	496	132	253	449	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phases	5		2	1		6	3	8	8	7	4	
Minimum Initial (s)	7.0	22.0	22.0	5.0	22.0	22.0	5.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	12.5	28.0	28.0	10.5	28.0	28.0	9.5	32.0	32.0	10.0	32.0	
Total Split (s)	25.0	38.0	38.0	20.0	33.0	33.0	15.0	32.0	32.0	20.0	37.0	0.0
Total Split (%)	23%	35%	35%	18%	30%	30%	14%	29%	29%	18%	34%	0%
Maximum Green (s)	19.5	32.0	32.0	14.5	27.0	27.0	10.5	26.0	26.0	15.5	31.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes						
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	Max	Coord	Coord	None	Coord	Coord	None	Min	Min	None	Min	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		15.0	15.0		15.0	15.0		19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	58.2	46.0	46.0	43.6	32.7	32.7	30.8	23.1	23.1	43.8	31.6	
Actuated g/C Ratio	0.53	0.42	0.42	0.40	0.30	0.30	0.28	0.21	0.21	0.40	0.29	
v/c Ratio	0.59	0.70	0.20	0.39	0.28	0.24	0.24	0.65	0.34	0.63	0.43	
Uniform Delay, d1	15.6	27.9	17.2	14.9	30.3	10.4	21.9	39.0	21.8	22.5	31.5	
Delay	17.1	27.5	20.1	15.8	30.8	13.3	21.0	39.4	21.8	36.9	43.7	
LOS	B	C	C	B	C	B	C	D	C	D	D	
Approach Delay		23.8			24.7			34.1			41.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			C			D	
90th %ile Green (s)	19.5	35.4	35.4	11.1	27.0	27.0	10.5	26.0	26.0	15.5	31.0	
90th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Max	Max	Max	Max	Hold	
70th %ile Green (s)	19.5	37.8	37.8	9.5	27.8	27.8	9.2	25.2	25.2	15.5	31.5	
70th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	19.5	42.1	42.1	8.3	30.9	30.9	8.3	22.1	22.1	15.5	29.3	
50th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	19.5	44.8	44.8	7.3	32.6	32.6	7.4	20.4	20.4	15.5	28.5	
30th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	19.5	65.1	65.1	0.0	40.1	40.1	0.0	16.6	16.6	11.8	32.9	
10th %ile Term Code	MaxR	Coord	Coord	Skip	Coord	Coord	Skip	Gap	Gap	Gap	Hold	
Queue Length 50th (m)	31.3	54.4	3.9	9.8	26.5	7.0	10.1	51.6	14.6	47.1	45.1	
Queue Length 95th (m)	61.0	#119.2	28.3	19.5	38.4	23.2	18.3	65.7	30.2	76.7	66.8	
Internal Link Dist (m)		129.8			136.7			84.0			96.0	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (m)	100.0		10.0	60.0		10.0	35.0		10.0			
50th Bay Block Time %								26%	28%			
95th Bay Block Time %		4%	41%			32%		36%	52%			
Queuing Penalty (veh)		14	92			20		23	100			

Intersection Summary

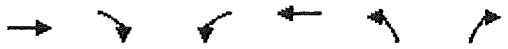
Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 35 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 28.6 Intersection LOS: C
Intersection Capacity Utilization 80.8% ICU Level of Service D
* User Entered Value
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Wye Rd & Sherwood Dr



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↱		↑↑↑		↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Turning Speed (k/h)		15	25		25	15
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	1.00
Frt		0.850				0.865
Flt Protected						
Satd. Flow (prot)	5245	1633	0	5245	0	1662
Flt Permitted						
Satd. Flow (perm)	5245	1633	0	5245	0	1662
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	60			60	60	
Link Distance (m)	76.3			96.9	39.2	
Travel Time (s)	4.6			5.8	2.4	
Volume (vph)	2100	70	0	750	0	211
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2100	70	0	750	0	211
Lane Group Flow (vph)	2100	70	0	750	0	211
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 62.0%		ICU Level of Service B	



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Turning Speed (k/h)		15	25		25	15
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	1.00
Frt						
Flt Protected			0.950			
Satd. Flow (prot)	5245	1921	1825	5245	0	1921
Flt Permitted			0.950			
Satd. Flow (perm)	5245	1921	1825	5245	0	1921
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	60			60	60	
Link Distance (m)	160.7			190.2	73.5	
Travel Time (s)	9.6			11.4	4.4	
Volume (vph)	1737	0	90	611	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1737	0	90	611	0	0
Lane Group Flow (vph)	1737	0	90	611	0	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 46.9%		ICU Level of Service A	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	20.0		0.0	50.0		50.0	30.0		30.0
Storage Lanes	1		0	1		0	1		1	1		1
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.895			0.865			0.982				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1719	0	1825	1662	0	1825	3584	0	1825	3650	1633
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1825	1719	0	1825	1662	0	1825	3584	0	1825	3650	1633
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		216.0			293.1			106.2			108.0	
Travel Time (s)		15.6			21.1			6.4			6.5	
Volume (vph)	124	19	44	18	15	134	44	388	52	130	305	203
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	124	19	44	18	15	134	44	388	52	130	305	203
Lane Group Flow (vph)	124	63	0	18	149	0	44	440	0	130	305	203
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	52.2%	ICU Level of Service	A



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.909		0.966			
Flt Protected	0.984					0.985
Satd. Flow (prot)	1718	0	1856	0	0	1892
Flt Permitted	0.984					0.985
Satd. Flow (perm)	1718	0	1856	0	0	1892
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	60		59			59
Link Distance (m)	418.3		157.0			33.9
Travel Time (s)	25.1		9.6			2.1
Volume (vph)	20	41	205	70	50	109
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	41	205	70	50	109
Lane Group Flow (vph)	61	0	275	0	0	159
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	39.7%	ICU Level of Service	A

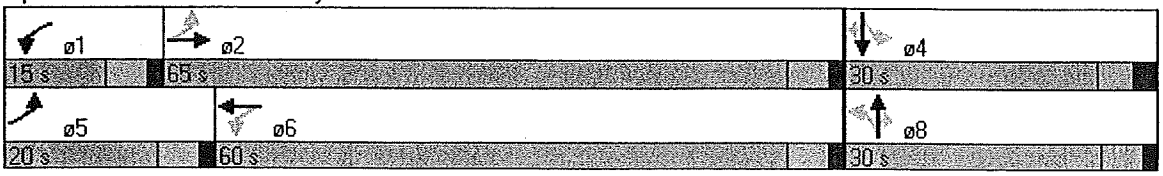
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	40.0		0.0	15.0		15.0	40.0		5.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	3.5	4.5	4.5	3.5	4.5	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	20		15	25		15
Lane Util. Factor	1.00	*0.85	0.91	1.00	*0.75	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.984				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	4874	0	1825	4253	0	1825	1921	1633	1825	1921	1633
Flt Permitted	0.250			0.071			0.728			0.725		
Satd. Flow (perm)	480	4874	0	136	4253	0	1399	1921	1633	1393	1921	1633
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			21				116			137
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		60			60			59			59	
Link Distance (m)		299.3			340.0			33.9			214.2	
Travel Time (s)		18.0			20.4			2.1			13.1	
Volume (vph)	240	2184	71	44	657	78	81	49	116	113	44	137
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	240	2184	71	44	657	78	81	49	116	113	44	137
Lane Group Flow (vph)	240	2255	0	44	735	0	81	49	116	113	44	137
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		4
Detector Phases	5			1			8	8		4	4	
Minimum Initial (s)	5.0	24.0		5.0	24.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	10.5	29.5		10.5	29.5		29.5	29.5	29.5	30.0	30.0	30.0
Total Split (s)	20.0	65.0	0.0	15.0	60.0	0.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	18%	59%	0%	14%	55%	0%	27%	27%	27%	27%	27%	27%
Maximum Green (s)	14.5	59.5		9.5	54.5		24.5	24.5	24.5	24.0	24.0	24.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	2.5	2.5	2.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?		Yes										
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	Min	Coord		None	Coord		Min	Min	Min	Min	Min	Min
Walk Time (s)		13.0			13.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		11.0			11.0		16.0	16.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		5			5		5	5	5	5	5	5
Act Effct Green (s)	82.4	71.7		76.6	66.7		18.5	18.5	18.5	18.5	18.5	18.5
Actuated g/C Ratio	0.75	0.65		0.70	0.61		0.17	0.17	0.17	0.17	0.17	0.17
v/c Ratio	0.48	0.71		0.19	0.28		0.34	0.15	0.31	0.48	0.14	0.35
Uniform Delay, d1	3.8	13.1		3.8	10.0		40.3	38.9	0.0	41.3	38.8	0.0
Delay	4.3	14.0		8.0	20.1		39.6	37.7	6.8	40.9	37.5	6.3
LOS	A	B		A	C		D	D	A	D	D	A
Approach Delay		13.0			19.4			23.8			24.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			C			C	
90th %ile Green (s)	13.5	60.3		8.7	55.5		24.5	24.5	24.5	24.0	24.0	24.0
90th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Ped	Ped	Ped
70th %ile Green (s)	10.6	67.4		7.5	64.3		18.6	18.6	18.6	18.1	18.1	18.1
70th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	Gap
50th %ile Green (s)	9.3	70.5		6.8	68.0		16.2	16.2	16.2	15.7	15.7	15.7
50th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	Gap
30th %ile Green (s)	8.3	71.8		6.2	69.7		15.5	15.5	15.5	15.0	15.0	15.0
30th %ile Term Code	Gap	Coord		Gap	Coord		Hold	Hold	Hold	Min	Min	Min
10th %ile Green (s)	7.3	83.5		0.0	70.7		15.5	15.5	15.5	15.0	15.0	15.0
10th %ile Term Code	Gap	Coord		Skip	Coord		Hold	Hold	Hold	Min	Min	Min
Queue Length 50th (m)	11.2	112.6		4.6	48.0		15.8	9.3	0.0	22.7	8.3	0.0
Queue Length 95th (m)	24.9	164.3		11.6	61.8		27.8	18.4	13.7	37.2	16.7	14.9
Internal Link Dist (m)		275.3			316.0			9.9			190.2	
50th Up Block Time (%)							35%					
95th Up Block Time (%)							52%	38%	21%			
Turn Bay Length (m)	50.0			40.0			15.0		15.0	40.0		5.0
50th Bay Block Time %		20%					10%					
95th Bay Block Time %		29%			13%		39%	19%	2%			43%
Queuing Penalty (veh)		58			3		75	17	12			33

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 15.9 Intersection LOS: B
Intersection Capacity Utilization 80.9% ICU Level of Service D
* User Entered Value

Splits and Phases: 3: Wye Rd & Ordze Rd



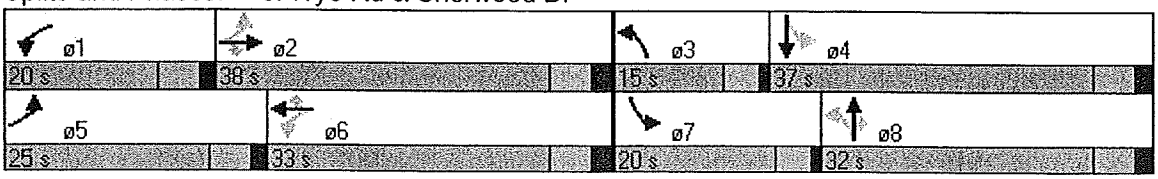
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	100.0		10.0	60.0		10.0	35.0		10.0	0.0		100.0
Storage Lanes	2		1	1		1	1		1	0		0
Total Lost Time (s)	4.5	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	3.5	5.0	5.0
Leading Detector (m)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3541	4611	1633	1825	4611	1633	1825	3650	1633	1825	3625	0
Flt Permitted	0.378			0.138			0.460			0.286		
Satd. Flow (perm)	1409	4611	1633	265	4611	1633	884	3650	1633	549	3625	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			26			84			51		5	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		153.8			160.7			108.0			120.0	
Travel Time (s)		9.2			9.6			6.5			7.2	
Volume (vph)	679	1352	137	95	384	132	75	496	132	253	428	21
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow.(vph)	679	1352	137	95	384	132	75	496	132	253	428	21
Lane Group Flow (vph)	679	1352	137	95	384	132	75	496	132	253	449	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phases	5		2	1		6	3	8	8	7	4	
Minimum Initial (s)	7.0	22.0	22.0	5.0	22.0	22.0	5.0	15.0	15.0	5.0	15.0	
Minimum Split (s)	12.5	28.0	28.0	10.5	28.0	28.0	9.5	32.0	32.0	10.0	32.0	
Total Split (s)	25.0	38.0	38.0	20.0	33.0	33.0	15.0	32.0	32.0	20.0	37.0	0.0
Total Split (%)	23%	35%	35%	18%	30%	30%	14%	29%	29%	18%	34%	0%
Maximum Green (s)	19.5	32.0	32.0	14.5	27.0	27.0	10.5	26.0	26.0	15.5	31.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes						
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	Max	Coord	Coord	None	Coord	Coord	None	Min	Min	None	Min	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		15.0	15.0		15.0	15.0		19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	58.5	46.4	46.4	43.9	33.0	33.0	30.4	22.7	22.7	43.5	31.3	
Actuated g/C Ratio	0.53	0.42	0.42	0.40	0.30	0.30	0.28	0.21	0.21	0.40	0.28	
v/c Ratio	0.59	0.70	0.19	0.39	0.28	0.24	0.24	0.66	0.35	0.63	0.43	
Uniform Delay, d1	15.4	27.7	17.0	14.8	30.1	10.3	22.1	39.2	21.9	22.7	31.7	
Delay	16.9	27.3	20.0	15.6	30.6	13.2	20.4	39.3	21.4	37.4	44.5	
LOS	B	C	C	B	C	B	C	D	C	D	D	
Approach Delay		23.6			24.5			33.9			41.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			C			D	
90th %ile Green (s)	19.5	35.4	35.4	11.1	27.0	27.0	10.5	26.0	26.0	15.5	31.0	
90th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Max	Max	Max	Max	Hold	
70th %ile Green (s)	19.5	38.6	38.6	9.4	28.5	28.5	9.3	24.5	24.5	15.5	30.7	
70th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	19.5	41.9	41.9	8.3	30.7	30.7	8.2	22.3	22.3	15.5	29.6	
50th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	19.5	45.9	45.9	7.3	33.7	33.7	7.3	19.3	19.3	15.5	27.5	
30th %ile Term Code	MaxR	Coord	Coord	Gap	Coord	Coord	Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	19.5	65.2	65.2	0.0	40.2	40.2	0.0	16.4	16.4	11.9	32.8	
10th %ile Term Code	MaxR	Coord	Coord	Skip	Coord	Coord	Skip	Gap	Gap	Gap	Hold	
Queue Length 50th (m)	31.3	54.4	3.9	9.8	26.6	7.0	9.8	53.4	0.0	46.9	44.5	
Queue Length 95th (m)	61.0	#119.2	28.3	19.5	38.4	23.2	17.4	69.2	26.9	76.7	66.8	
Internal Link Dist (m)		129.8			136.7			84.0			96.0	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (m)	100.0		10.0	60.0		10.0	35.0		10.0			
50th Bay Block Time %								24%	10%			
95th Bay Block Time %		4%	41%			32%		37%	29%			
Queuing Penalty (veh)		14	92			20		23	48			

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 35 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 28.5 Intersection LOS: C
Intersection Capacity Utilization 80.8% ICU Level of Service D
* User Entered Value
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

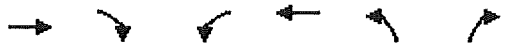
Splits and Phases: 6: Wye Rd & Sherwood Dr





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↱		↑↑↑		↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Turning Speed (k/h)		15	25		25	15
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	1.00
Frt		0.850				0.865
Flt Protected						
Satd. Flow (prot)	5245	1633	0	5245	0	1662
Flt Permitted						
Satd. Flow (perm)	5245	1633	0	5245	0	1662
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	60			60	60	
Link Distance (m)	76.3			96.9	39.2	
Travel Time (s)	4.6			5.8	2.4	
Volume (vph)	2100	70	0	750	0	211
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2100	70	0	750	0	211
Lane Group Flow (vph)	2100	70	0	750	0	211
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	62.0%	ICU Level of Service	B



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↱	↰	↑↑↑		↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Turning Speed (k/h)		15	25		25	15
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	1.00
Frt						
Flt Protected			0.950			
Satd. Flow (prot)	5245	1921	1825	5245	0	1921
Flt Permitted			0.950			
Satd. Flow (perm)	5245	1921	1825	5245	0	1921
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	60			60	60	
Link Distance (m)	160.7			190.2	73.5	
Travel Time (s)	9.6			11.4	4.4	
Volume (vph)	1737	0	90	611	0	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1737	0	90	611	0	0
Lane Group Flow (vph)	1737	0	90	611	0	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 46.9%		ICU Level of Service A	

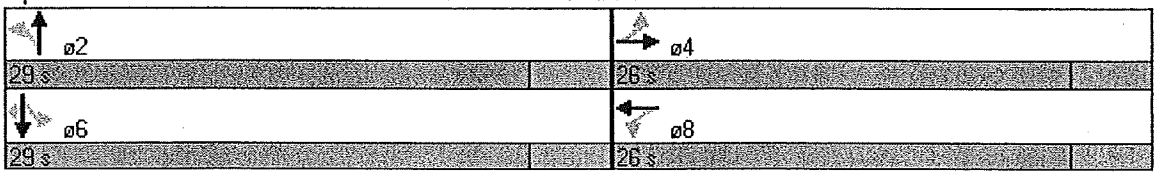
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	20.0		0.0	50.0		50.0	30.0		30.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.895			0.865			0.982				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1719	0	1825	1662	0	1825	3584	0	1825	3650	1633
Flt Permitted	0.662			0.716			0.566			0.497		
Satd. Flow (perm)	1272	1719	0	1376	1662	0	1087	3584	0	955	3650	1633
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		44			134			34				203
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		216.0			293.1			106.2			108.0	
Travel Time (s)		15.6			21.1			6.4			6.5	
Volume (vph)	124	19	44	18	15	134	44	388	52	130	305	203
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	124	19	44	18	15	134	44	388	52	130	305	203
Lane Group Flow (vph)	124	63	0	18	149	0	44	440	0	130	305	203
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phases	4	4		8	8		2	2		6	6	6
Minimum Initial (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Minimum Split (s)	26.0	26.0		26.0	26.0		26.0	26.0		26.0	26.0	26.0
Total Split (s)	26.0	26.0	0.0	26.0	26.0	0.0	29.0	29.0	0.0	29.0	29.0	29.0
Total Split (%)	47%	47%	0%	47%	47%	0%	53%	53%	0%	53%	53%	53%
Maximum Green (s)	22.0	22.0		22.0	22.0		25.0	25.0		25.0	25.0	25.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Recall Mode	None	None		None	None		Coord	Coord		Coord	Coord	Coord
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	14.3	14.3		14.3	14.3		35.5	35.5		35.5	35.5	35.5
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.65	0.65		0.65	0.65	0.65
v/c Ratio	0.37	0.13		0.05	0.28		0.06	0.19		0.21	0.13	0.18
Uniform Delay, d1	19.2	5.3		17.6	1.8		4.3	4.3		4.8	4.5	0.0
Delay	16.7	6.5		15.2	4.7		6.0	5.3		3.0	2.8	0.5
LOS	B	A		B	A		A	A		A	A	A
Approach Delay		13.3			5.9			5.4			2.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			A			A	
90th %ile Green (s)	16.5	16.5		16.5	16.5		30.5	30.5		30.5	30.5	30.5
90th %ile Term Code	Gap	Gap		Hold	Hold		Coord	Coord		Coord	Coord	Coord
70th %ile Green (s)	15.0	15.0		15.0	15.0		32.0	32.0		32.0	32.0	32.0
70th %ile Term Code	Min	Min		Min	Min		Coord	Coord		Coord	Coord	Coord
50th %ile Green (s)	15.0	15.0		15.0	15.0		32.0	32.0		32.0	32.0	32.0
50th %ile Term Code	Min	Min		Min	Min		Coord	Coord		Coord	Coord	Coord
30th %ile Green (s)	15.0	15.0		15.0	15.0		32.0	32.0		32.0	32.0	32.0
30th %ile Term Code	Min	Min		Min	Min		Coord	Coord		Coord	Coord	Coord
10th %ile Green (s)	0.0	0.0		0.0	0.0		51.0	51.0		51.0	51.0	51.0
10th %ile Term Code	Skip	Skip		Skip	Skip		Coord	Coord		Coord	Coord	Coord
Queue Length 50th (m)	10.6	0.0		1.4	0.6		1.8	9.1		4.6	5.6	0.0
Queue Length 95th (m)	m18.7	m0.0		5.0	7.8		5.5	16.0		5.0	5.1	0.0
Internal Link Dist (m)		192.0			269.1			82.2			84.0	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (m)	50.0			20.0			50.0			30.0		30.0
50th Bay Block Time %												
95th Bay Block Time %												
Queuing Penalty (veh)												

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 55
Offset: 34 (62%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.37
Intersection Signal Delay: 5.0 Intersection LOS: A
Intersection Capacity Utilization 66.7% ICU Level of Service B
m Volume for 95th percentile queue is metered by upstream signal.

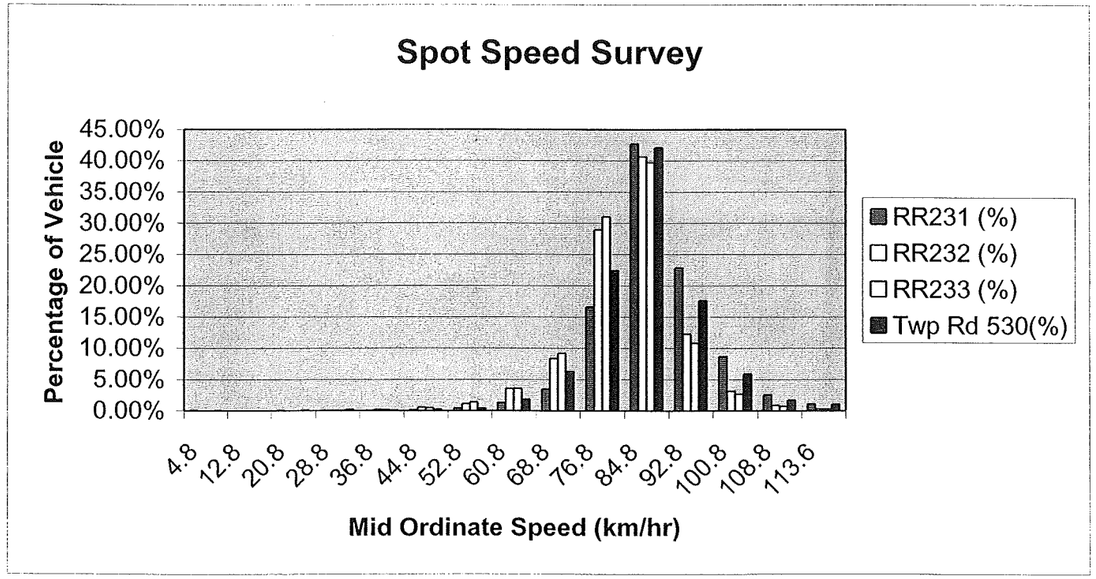
Splits and Phases: 193: Ordze Cres & Sherwood Dr

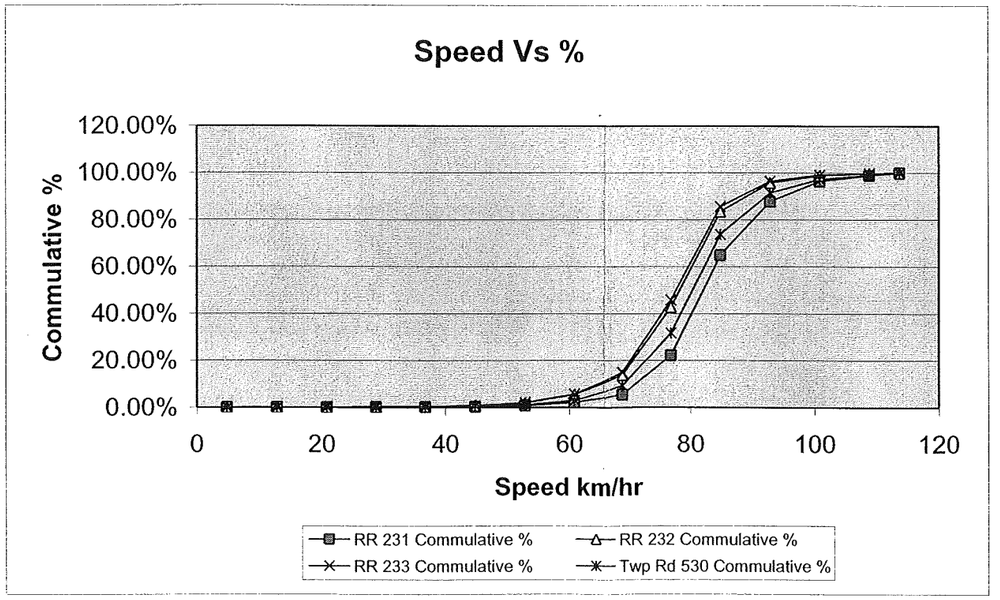


APPENDIX C

SPOT SPEED SURVEY

				Range Road 231					Range Road 232					Range Road 233					Township Road 530				
				3 Weekdays					3 Weekdays					3 Weekdays					4 Weekdays				
				July 14 - 16, 1999					July 16 - 20, 1999					July 14 - 16, 1999					August 1 - 8 2000				
	Speed mph		Mid Ordinate (Km/Hr)	NB	SB	Total	RR231 (%)	RR 231 Commulative %	NB	SB	Total	RR232 (%)	RR 232 Commulative %	NB	SB	Total	RR233 (%)	RR 233 Commulative %	EB	WB	Total	Twp Rd 530(%)	Twp Rd 530 Commulative %
	1	5	4.8	6	1	7	0.07%	0.07%	0	0	0	0.00%	0.00%	0	0	0	0.00%	0.00%	0	4	4	0.03%	0.03%
	6	10	12.8	1	0	1	0.01%	0.08%	1	0	1	0.01%	0.01%	0	0	0	0.00%	0.00%	1	1	2	0.02%	0.05%
	11	15	20.8	0	3	3	0.03%	0.11%	2	1	3	0.02%	0.03%	1	1	2	0.01%	0.01%	1	7	8	0.07%	0.12%
	16	20	28.8	3	2	5	0.05%	0.17%	3	3	6	0.04%	0.06%	1	3	4	0.02%	0.03%	2	20	22	0.19%	0.31%
	21	25	36.8	3	0	3	0.03%	0.20%	10	25	35	0.22%	0.28%	5	25	30	0.17%	0.20%	2	9	11	0.10%	0.41%
	26	30	44.8	9	8	17	0.18%	0.37%	31	61	92	0.58%	0.86%	24	61	85	0.47%	0.67%	4	24	28	0.24%	0.66%
	31	35	52.8	16	25	41	0.43%	0.80%	105	70	175	1.10%	1.96%	176	70	246	1.37%	2.05%	16	31	47	0.41%	1.07%
	36	40	60.8	70	56	126	1.31%	2.11%	304	259	563	3.53%	5.49%	382	259	641	3.57%	5.62%	89	122	211	1.84%	2.91%
	41	45	68.8	176	156	332	3.44%	5.55%	522	812	1334	8.36%	13.85%	839	812	1651	9.20%	14.82%	307	417	724	6.32%	9.23%
	46	50	76.8	659	944	1603	16.63%	22.18%	1778	2838	4616	28.94%	42.78%	2725	2835	5560	31.00%	45.82%	1179	1388	2567	22.42%	31.66%
	51	55	84.8	2060	2054	4114	42.69%	64.87%	3013	3470	6483	40.64%	83.43%	3658	3470	7128	39.74%	85.57%	2264	2558	4822	42.12%	73.78%
	56	60	92.8	1293	909	2202	22.85%	87.72%	1003	956	1959	12.28%	95.71%	987	956	1943	10.83%	96.40%	874	1144	2018	17.63%	91.40%
	61	65	100.8	485	352	837	8.68%	96.40%	252	246	498	3.12%	98.83%	236	246	482	2.69%	99.09%	290	384	674	5.89%	97.29%
	66	70	108.8	150	93	243	2.52%	98.92%	72	65	137	0.86%	99.69%	56	65	121	0.67%	99.76%	67	126	193	1.69%	98.98%
	71		113.6	51	53	104	1.08%	100.00%	31	19	50	0.31%	100.00%	24	19	43	0.24%	100.00%	42	75	117	1.02%	100.00%
TOTAL				4982	4656	9638			7127	8825	15952			9114	8822	17936			5138	6310	11448		
85th Percentile Speed, km/hr								**91.85**					**85.83**					**84.38**					**89.89**
% Travelling at 80 km/hr or less								**39.26%**					**59.04%**					**61.72%**					**48.50%**





STRATHCONA COUNTY

Engineering & Environmental Planning
2001 Sherwood Drive
Sherwood Park, AB Canada
T8A 3W7
Fax: (780) 464-8116

PLEASE TRANSMIT THE FOLLOWING CORRESPONDENCE TO:		
NAME: Hassan Shaheen		FAX: 488-2121
FIRM: Earth Tech Canada Inc.		
RE: RR's 231, 232 and RR 233 & TR 530 Functional Planning Study		
FROM: Dave Friesen		PHONE: 464-8035
DATE: September 23, 2002	TIME: 2:30 PM	# OF PAGES (INCLUDING COVER SHEET) 9
ORIGINAL TO FOLLOW IN MAIL: NO		

FURTHER INSTRUCTIONS:

Hassan;

Attached are the speed profiles we have for the Range Road's 231, 2 & 3 and TR 530.

Please call if you have any questions.

Regards;
Dave

IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CONTACT THE ORIGINATOR AS SOON AS POSSIBLE.
A08

Document #: EEP Transportation Engineering.5755.7723.1
Created/Revised: September 23, 2002
Created by: Friesen, Dave

SPEED SUMMARY (NORTHBOUND)

RGE RD 231, HALFWAY BETWEEN TWP RD 522 & 524 - JULY 14-16/99

Speed(mph)

END TIME	1-5	6-10	13-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71+	TOTAL	AVERAGE SPEED	85th %ILE
1:00	0	0	0	0	0	0	0	0	5	6	24	22	9	3	2	71	55.89	62.65
2:00	0	0	0	0	0	0	1	0	1	3	16	7	3	2	2	35	55.57	63.66
3:00	0	0	0	0	0	0	1	2	0	1	4	3	2	1	4	18	57.17	70.14
4:00	0	0	0	0	0	0	0	0	0	0	2	2	3	1	1	9	61.33	68.19
5:00	0	0	0	0	0	0	0	0	0	0	3	0	0	2	1	6	61.33	70.98
6:00	0	0	0	0	0	0	0	1	2	0	4	0	1	0	1	9	52.44	63.57
7:00	0	0	0	0	0	1	0	3	6	17	25	16	9	4	2	83	53.66	61.99
8:00	0	0	0	0	0	0	0	1	12	40	83	41	10	7	0	194	53.39	59.16
9:00	0	0	0	2	1	1	0	0	5	24	88	52	18	6	1	198	54.29	61.52
10:00	0	0	0	0	0	0	0	0	13	29	65	40	17	4	2	170	54.15	60.43
11:00	0	0	0	0	0	1	0	3	12	38	65	39	22	7	1	188	53.85	60.82
12:00	2	1	0	0	0	0	1	2	3	31	72	53	20	2	2	189	53.82	62.57
13:00	1	0	0	0	0	1	2	3	13	40	104	54	23	8	1	250	53.60	60.99
14:00	2	0	0	1	0	0	0	3	14	40	105	52	15	9	0	241	53.10	61.05
15:00	0	0	0	0	0	0	1	5	14	23	148	71	36	7	3	308	54.72	60.85
16:00	0	0	0	0	0	0	1	4	10	47	138	104	20	5	2	331	54.27	59.82
17:00	0	0	0	0	0	0	1	7	17	55	229	140	44	14	1	508	54.57	60.26
18:00	1	0	0	0	0	3	2	18	9	60	245	179	66	21	6	610	54.91	61.89
19:00	0	0	0	0	1	0	1	4	3	33	128	118	53	21	7	369	56.44	63.00
20:00	0	0	0	0	0	0	0	2	5	28	119	83	32	6	6	281	55.58	61.39
21:00	0	0	0	0	1	0	2	1	6	55	150	71	24	6	1	317	53.90	59.60
22:00	0	0	0	0	0	0	1	7	13	31	119	65	26	8	2	272	54.23	60.67
23:00	0	0	0	0	0	0	1	1	7	42	88	41	13	1	2	196	53.38	58.98
24:00	0	0	0	0	0	2	1	3	6	16	36	40	19	5	1	129	54.78	62.63
TOTALS	6	1	0	3	3	9	16	70	176	659	2060	1293	485	150	51	4982	54.48	61.20

The above summary includes daily data from July 14-16/99 (3 weekdays)

SPEED SUMMARY (SOUTHBOUND)

RGE RD 231, HALFWAY BETWEEN TWP RD 522 & 524 - JULY 14-16/99

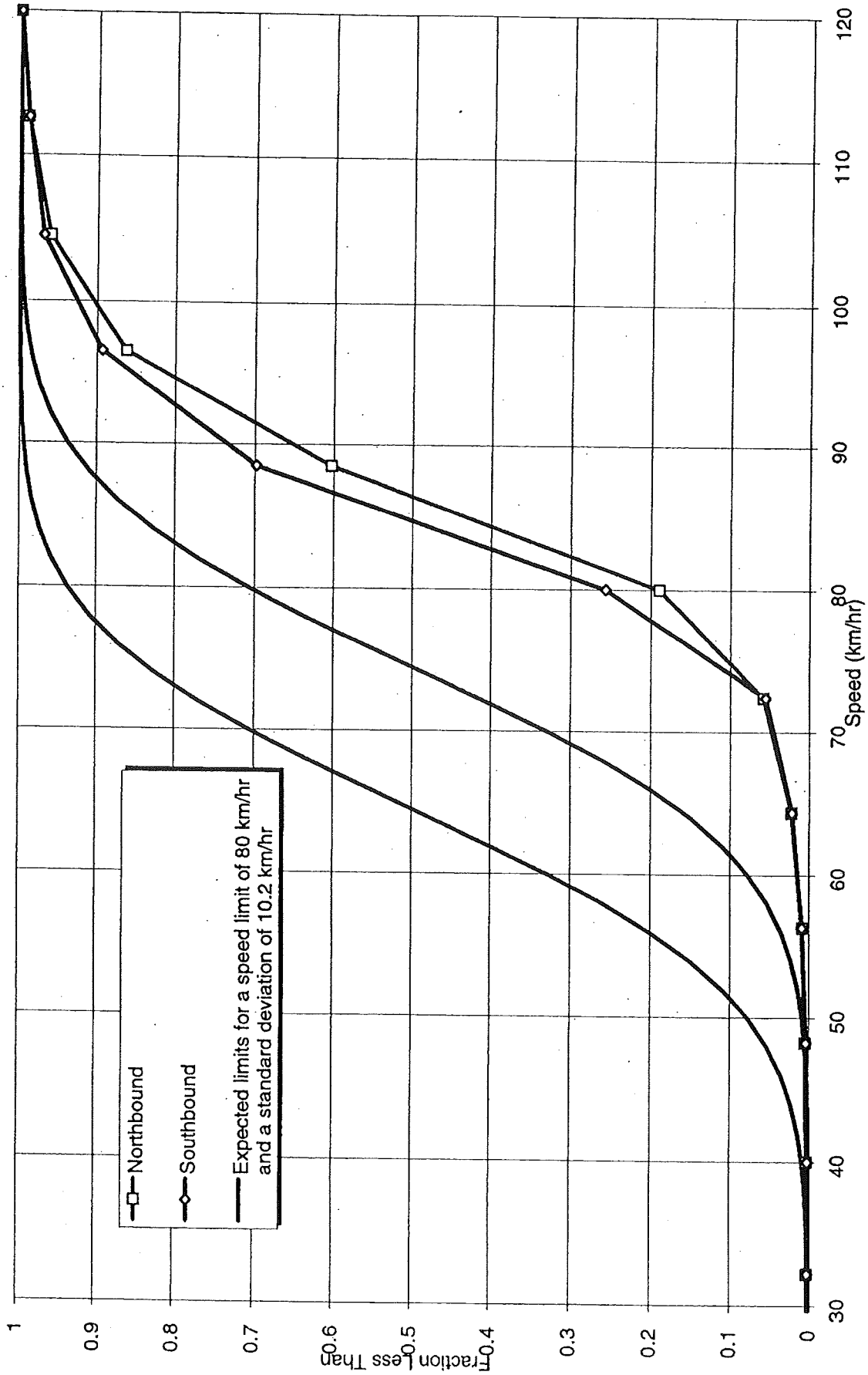
Speed(mph)

END TIME	1-5	6-10	13-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71+	TOTAL	AVERAGE SPEED	85th %ILE
1:00	0	0	0	0	0	0	0	1	2	7	4	5	6	4	1	30	56.17	65.45
2:00	0	0	0	0	0	0	0	2	1	3	3	1	2	1	2	15	54.67	66.53
3:00	0	0	0	0	0	0	2	0	1	0	2	5	2	1	1	14	55.14	67.29
4:00	0	0	1	0	0	0	0	0	0	0	0	2	1	0	1	5	53.00	77.03
5:00	0	0	0	0	0	0	0	0	0	0	3	3	1	2	3	12	62.58	70.99
6:00	0	0	0	0	0	0	1	0	0	7	12	7	6	1	2	36	55.64	56.99
7:00	0	0	0	0	0	1	0	0	2	18	87	67	25	9	4	213	56.12	62.08
8:00	0	0	0	0	0	0	1	4	6	92	252	79	20	8	5	467	53.46	58.69
9:00	0	0	1	0	0	0	0	0	4	58	149	77	13	5	0	307	53.72	58.90
10:00	0	0	0	0	0	0	1	4	8	46	94	38	22	5	1	219	53.53	59.75
11:00	0	0	0	0	0	1	1	3	7	59	120	34	9	2	3	239	52.56	58.27
12:00	0	0	0	0	0	1	2	6	10	63	100	37	18	1	2	240	52.38	58.74
13:00	0	0	0	0	0	0	2	6	14	55	121	38	20	3	2	261	52.73	58.94
14:00	0	0	1	0	0	1	2	5	14	42	108	47	21	4	2	247	53.06	60.17
15:00	0	0	0	0	0	0	1	5	7	46	98	43	14	4	4	222	53.45	59.80
16:00	1	0	0	0	0	1	2	6	7	50	123	52	15	8	1	266	53.09	60.13
17:00	0	0	0	0	0	1	1	2	11	73	115	58	27	7	3	298	53.59	59.96
18:00	0	0	0	0	0	0	1	0	16	85	171	70	26	3	0	372	53.13	58.28
19:00	0	0	0	0	0	1	1	1	8	54	141	75	40	7	5	333	54.71	60.91
20:00	0	0	0	1	0	0	0	2	8	63	124	72	21	3	2	296	53.66	59.48
21:00	0	0	0	0	0	0	1	3	10	50	79	39	17	5	2	206	53.32	59.75
22:00	0	0	0	0	0	1	1	1	4	41	77	31	11	5	3	175	53.54	60.03
23:00	0	0	0	1	0	0	3	4	8	24	49	20	7	2	2	120	52.04	60.03
24:00	0	0	0	0	0	0	2	1	8	8	22	9	8	3	2	63	53.56	62.39
TALS	1	0	3	2	0	8	25	56	156	944	2054	909	352	93	53	4656	53.53	59.89

The above summary includes daily data from July 14-16/99 (3 weekdays)

CUMULATIVE FREQUENCY PLOT OF MEASURED SPEEDS

RGE RD 231, HALFWAY BETWEEN TWP RD 522 & 524 - JULY 14-16/99



\class\counts\Hourly Chart 1

SPEED SUMMARY (NORTHBOUND)

RGE RD 232, HALFWAY BETWEEN TWP RD 522 & 524 - JULY 16-20/99

Speed(mph)

END TIME	1-5	6-10	13-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71+	TOTAL	AVERAGE SPEED	85th %ILE
1:00	0	0	0	0	0	0	0	2	8	14	26	15	6	3	5	79	54.27	62.67
2:00	0	0	0	0	0	0	0	2	3	3	7	6	5	3	2	31	55.90	65.72
3:00	0	0	0	0	0	0	1	1	0	5	6	4	0	2	0	19	52.47	61.26
4:00	0	0	2	0	0	1	1	0	2	2	2	5	2	1	1	19	49.05	66.55
5:00	0	0	0	0	0	1	2	0	0	2	1	2	1	1	0	10	49.00	63.20
6:00	0	0	0	0	0	0	0	2	2	2	7	4	1	5	0	23	54.96	64.68
7:00	0	0	0	0	0	2	1	6	3	26	35	22	7	6	2	110	52.91	61.42
8:00	0	0	0	0	0	0	5	14	21	57	126	54	13	1	2	293	51.81	58.43
9:00	0	0	0	0	0	2	7	18	18	91	164	62	29	5	0	396	51.94	58.80
10:00	0	0	0	1	0	3	7	12	19	67	98	39	7	2	4	259	50.76	58.56
11:00	0	0	0	1	0	2	9	22	26	92	130	25	6	2	1	316	49.58	56.57
12:00	0	0	0	1	2	1	5	15	25	88	146	48	6	2	0	339	50.63	57.31
13:00	0	0	0	0	0	2	5	19	38	117	166	46	5	3	1	402	50.38	56.54
14:00	0	0	0	0	1	3	9	22	35	109	141	50	12	2	0	384	50.11	57.06
15:00	0	0	0	0	1	2	8	24	35	122	179	45	11	1	1	429	50.23	56.73
16:00	0	0	0	0	0	3	3	20	43	113	207	68	16	2	1	476	51.15	57.39
17:00	0	1	0	0	2	5	6	11	34	157	331	84	11	2	1	645	51.36	57.34
18:00	0	0	0	0	1	1	3	26	37	167	382	133	23	2	0	775	51.99	57.48
19:00	0	0	0	0	1	0	8	18	29	116	214	86	26	7	3	508	52.06	58.74
20:00	0	0	0	0	1	2	6	19	42	111	160	52	20	3	1	417	50.76	57.59
21:00	0	0	0	0	0	0	6	20	40	110	159	55	15	5	0	410	50.88	57.32
22:00	0	0	0	0	1	1	8	16	38	120	174	40	14	5	0	417	50.55	57.01
23:00	0	0	0	0	0	0	5	10	14	60	90	31	8	6	3	227	51.66	58.84
24:00	0	0	0	0	0	0	0	5	10	27	62	27	8	1	3	143	52.86	59.43
TOTALS	0	1	2	3	10	31	105	304	522	1778	3013	1003	252	72	31	7127	51.20	57.92

The above summary includes daily data from July 16-20/99 (3 weekdays)

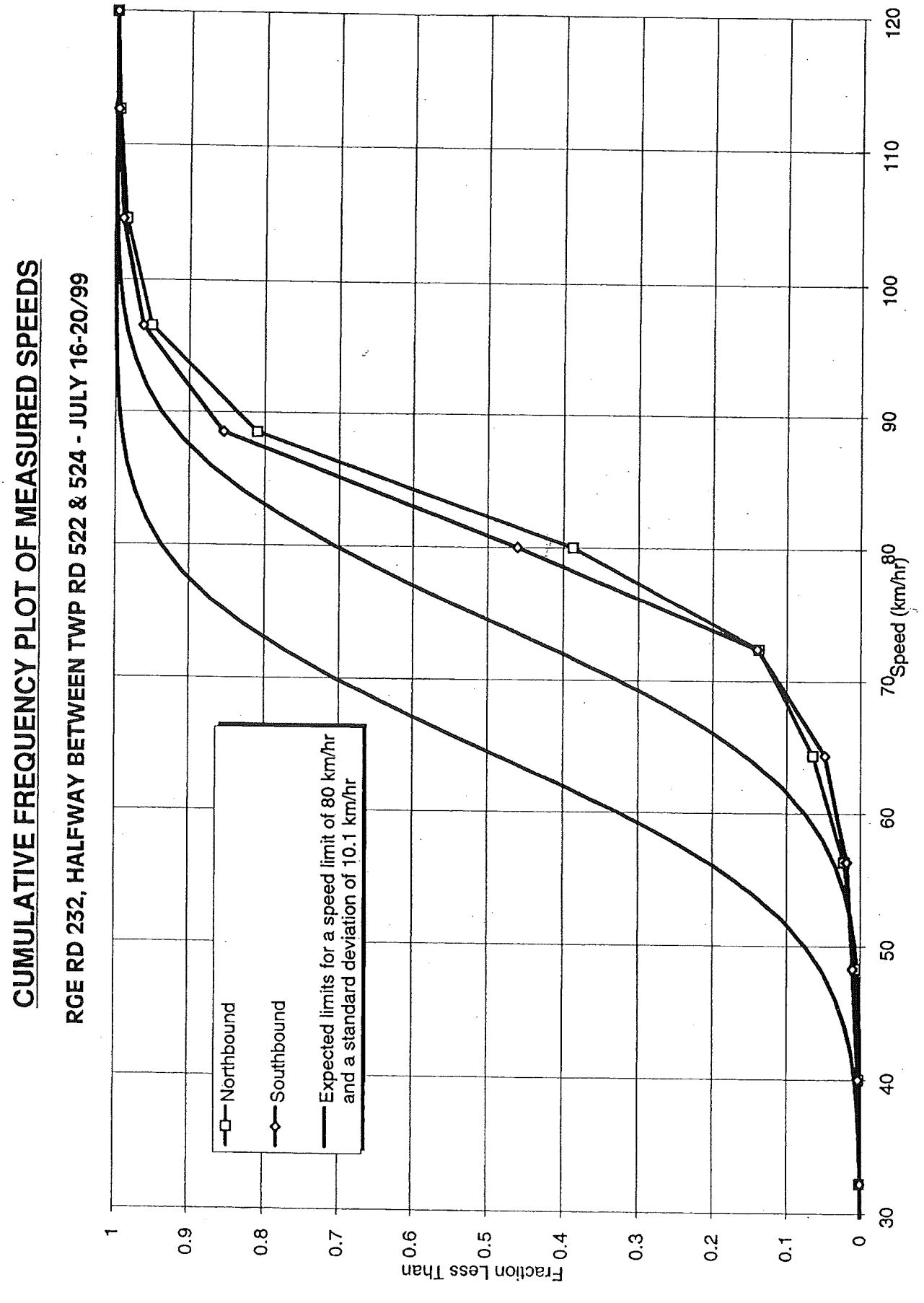
SPEED SUMMARY (SOUTHBOUND)

RGE RD 232, HALFWAY BETWEEN TWP RD 522 & 524 - JULY 16-20/99

Speed(mph)

END TIME	1-5	6-10	13-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71+	TOTAL	AVERAGE SPEED	85th %ILE
1:00	0	0	0	0	0	0	0	7	11	26	18	17	4	1	1	85	50.82	58.30
2:00	0	0	0	0	0	0	0	2	1	3	7	2	4	2	1	22	55.05	64.73
3:00	0	0	0	0	0	0	0	0	2	5	6	1	2	0	0	16	51.75	57.88
4:00	0	0	0	1	1	0	0	0	1	1	5	2	1	1	2	15	52.67	68.87
5:00	0	0	0	0	0	0	0	0	0	0	5	3	0	1	0	9	56.33	61.52
6:00	0	0	0	0	0	0	0	0	5	9	26	14	6	2	0	62	54.05	55.59
7:00	0	0	0	0	0	2	1	0	6	44	111	39	34	2	1	240	53.98	60.10
8:00	0	0	0	0	2	2	1	6	36	159	261	71	12	3	1	554	51.49	56.92
9:00	0	0	0	0	2	5	2	12	36	144	178	54	9	2	2	446	50.63	56.97
10:00	0	0	0	0	1	2	2	8	27	122	156	43	14	2	0	377	51.05	56.90
11:00	0	0	0	0	1	5	0	6	62	151	172	30	9	1	0	437	49.88	55.53
12:00	0	0	0	1	6	3	5	20	58	153	140	34	9	1	0	430	48.91	55.88
13:00	0	0	0	0	1	6	7	19	50	165	190	46	15	4	1	504	50.08	56.70
14:00	0	0	0	0	3	3	6	22	69	194	190	40	10	2	2	541	49.48	55.82
15:00	0	0	0	0	2	4	9	27	54	185	177	66	10	4	2	540	49.89	56.68
16:00	0	0	0	1	0	2	6	13	47	205	236	57	13	2	1	583	50.55	56.26
17:00	0	0	1	0	2	5	6	18	75	252	265	75	15	1	0	715	50.08	56.13
18:00	0	0	0	0	0	4	6	20	67	282	307	79	15	7	0	787	50.52	56.17
19:00	0	0	0	0	1	4	7	19	64	209	311	79	16	4	2	716	50.79	56.77
20:00	0	0	0	0	1	5	2	14	39	161	249	84	13	4	0	572	51.27	57.17
21:00	0	0	0	0	1	1	5	12	38	133	156	37	8	7	0	398	50.46	56.64
22:00	0	0	0	0	1	1	1	13	22	119	144	42	16	4	0	363	51.20	57.26
23:00	0	0	0	0	0	2	1	12	22	71	111	22	6	3	3	253	50.83	57.41
24:00	0	0	0	0	0	5	3	9	20	45	49	19	5	5	0	160	49.72	57.88
TOTALS	0	0	1	3	25	61	70	259	812	2838	3470	956	246	65	19	8825	50.57	56.84

The above summary includes daily data from July 16-20/99 (3 weekdays)



\class\counts\Hourly Chart 1

SPEED SUMMARY (NORTHBOUND)

RGE RD 233, HALFWAY BETWEEN TWP RD 522 & 524 - JULY 14-16/99

Speed(mph)

END TIME	1-5	6-10	13-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71+	TOTAL	AVERAGE SPEED	85th %ILE
1:00	0	0	0	0	0	0	1	5	6	19	26	11	3	3	3	77	52.22	60.63
2:00	0	0	0	0	0	2	1	1	2	4	22	8	5	1	0	46	52.57	61.16
3:00	0	0	0	0	0	0	0	0	2	6	8	3	3	2	3	27	56.15	65.48
4:00	0	0	0	0	0	0	0	1	1	4	1	3	2	2	0	14	54.43	64.06
5:00	0	0	0	0	0	0	0	0	1	1	6	2	1	1	0	12	54.67	61.42
6:00	0	0	0	0	0	0	0	0	3	12	10	10	5	1	0	41	53.61	60.08
7:00	0	0	0	0	1	3	16	8	19	40	65	24	5	1	0	182	48.88	57.36
8:00	0	0	0	0	0	1	10	20	29	98	152	45	7	3	0	365	50.36	56.88
9:00	0	0	0	0	0	1	16	35	40	127	172	38	10	0	2	441	49.43	56.28
10:00	0	0	0	0	1	2	17	25	60	99	139	38	11	4	1	397	49.20	56.68
11:00	0	0	0	0	0	2	9	23	43	135	179	43	7	2	1	444	49.97	56.25
12:00	0	0	0	0	1	1	9	32	47	174	188	37	10	3	1	503	49.61	55.92
13:00	0	0	0	0	0	3	19	20	44	176	191	46	10	0	0	509	49.57	55.90
14:00	0	0	0	0	0	2	10	22	55	170	219	45	3	2	0	528	49.79	55.57
15:00	0	0	1	1	0	1	11	30	68	179	182	45	8	1	1	528	49.20	55.72
16:00	0	0	0	0	1	0	13	25	78	213	274	59	13	0	2	678	49.98	55.93
17:00	0	0	0	0	0	1	8	22	74	232	400	76	22	3	4	842	50.99	56.64
18:00	0	0	0	0	0	2	7	23	62	285	423	125	23	4	1	955	51.28	56.73
19:00	0	0	0	0	0	2	8	22	50	162	287	85	22	3	0	641	51.19	57.18
20:00	0	0	0	0	1	0	6	15	25	173	215	73	15	6	0	529	51.33	57.16
21:00	0	0	0	0	0	0	1	18	35	142	183	65	20	4	1	469	51.41	57.33
22:00	0	0	0	0	0	0	6	12	44	143	163	57	14	5	2	446	50.95	57.15
23:00	0	0	0	0	0	0	3	17	37	71	94	30	8	3	1	264	50.18	56.89
24:00	0	0	0	0	0	1	5	6	14	60	59	19	9	2	1	176	50.61	57.66
TOTALS	0	0	1	1	5	24	176	382	839	2725	3658	987	236	56	24	9114	50.42	56.76

The above summary includes daily data from July 14-16/99 (3 weekdays)

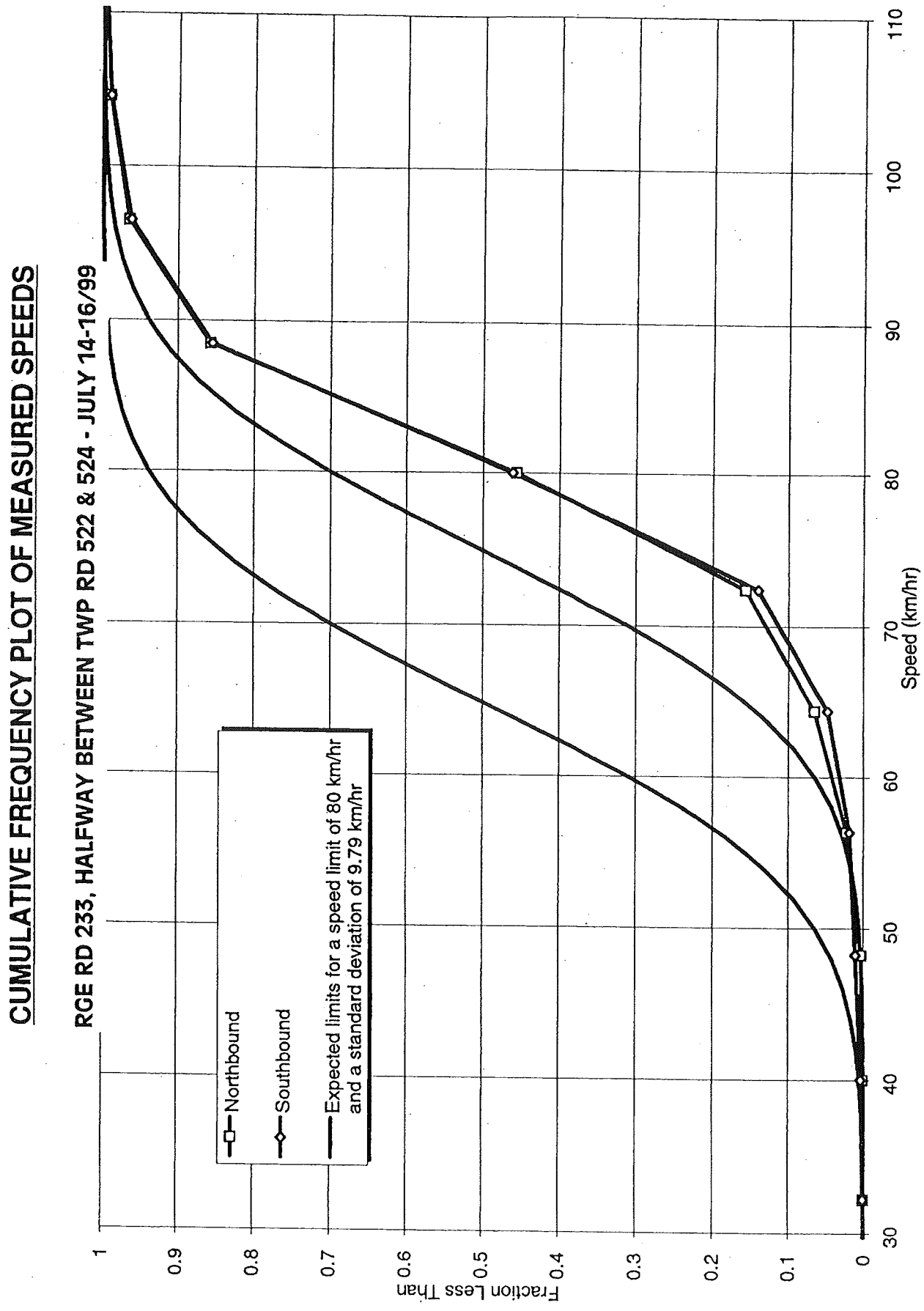
SPEED SUMMARY (SOUTHBOUND)

RGE RD 233, HALFWAY BETWEEN TWP RD 522 & 524 - JULY 14-16/99

Speed(mph)

END TIME	1-5	6-10	13-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71+	TOTAL	AVERAGE SPEED	85th %ILE
1:00	0	0	0	0	0	0	0	7	11	26	18	17	4	1	1	85	50.82	58.30
2:00	0	0	0	0	0	0	0	2	1	3	7	2	4	2	1	22	55.05	64.73
3:00	0	0	0	0	0	0	0	0	2	5	6	1	2	0	0	16	51.75	57.88
4:00	0	0	0	1	1	0	0	0	1	1	5	2	1	1	2	15	52.67	68.87
5:00	0	0	0	0	0	0	0	0	0	0	5	3	0	1	0	9	56.33	61.52
6:00	0	0	0	0	0	0	0	0	5	9	26	14	6	2	0	62	54.05	55.59
7:00	0	0	0	0	0	2	1	0	6	44	111	39	34	2	1	240	53.98	60.10
8:00	0	0	0	0	2	2	1	6	36	159	261	71	12	3	1	554	51.49	56.92
9:00	0	0	0	0	2	5	2	12	36	144	178	54	9	2	2	446	50.63	56.97
10:00	0	0	0	0	1	2	2	8	27	122	156	43	14	2	0	377	51.05	56.90
11:00	0	0	0	0	1	5	0	6	62	151	172	30	9	1	0	437	49.88	55.53
12:00	0	0	0	1	6	3	5	20	58	153	140	34	9	1	0	430	48.91	55.88
13:00	0	0	0	0	1	6	7	19	50	165	190	46	15	4	1	504	50.08	56.70
14:00	0	0	0	0	3	3	6	22	69	194	190	40	10	2	2	541	49.48	55.82
15:00	0	0	0	0	2	4	9	27	54	185	177	66	10	4	2	540	49.89	56.68
16:00	0	0	0	1	0	2	6	13	47	205	236	57	13	2	1	583	50.55	56.26
17:00	0	0	1	0	2	5	6	18	75	252	265	75	15	1	0	715	50.08	56.13
18:00	0	0	0	0	0	4	6	20	67	282	307	79	15	7	0	787	50.52	56.17
19:00	0	0	0	0	1	4	7	19	64	209	311	79	16	4	2	716	50.79	56.77
20:00	0	0	0	0	1	5	2	14	39	161	249	84	13	4	0	572	51.27	57.17
21:00	0	0	0	0	1	1	5	12	38	133	156	37	8	7	0	398	50.46	56.64
22:00	0	0	0	0	1	1	1	13	22	119	144	42	16	4	0	363	51.20	57.26
23:00	0	0	0	0	0	2	1	12	22	71	111	22	6	3	3	253	50.83	57.41
24:00	0	0	0	0	0	5	3	9	20	45	49	19	5	5	0	160	49.72	57.88
ALS	0	0	1	3	25	61	70	259	812	2838	3470	956	246	65	19	8825	50.57	56.84

The above summary includes daily data from July 14-16/99 (3 weekdays)



\class\counts\Hourly Chart 1

SPEED SUMMARY (Eastbound)
Twp Rd 530 West of Rge Rd 224 (August 1-8, 2000)
Speed(mph)

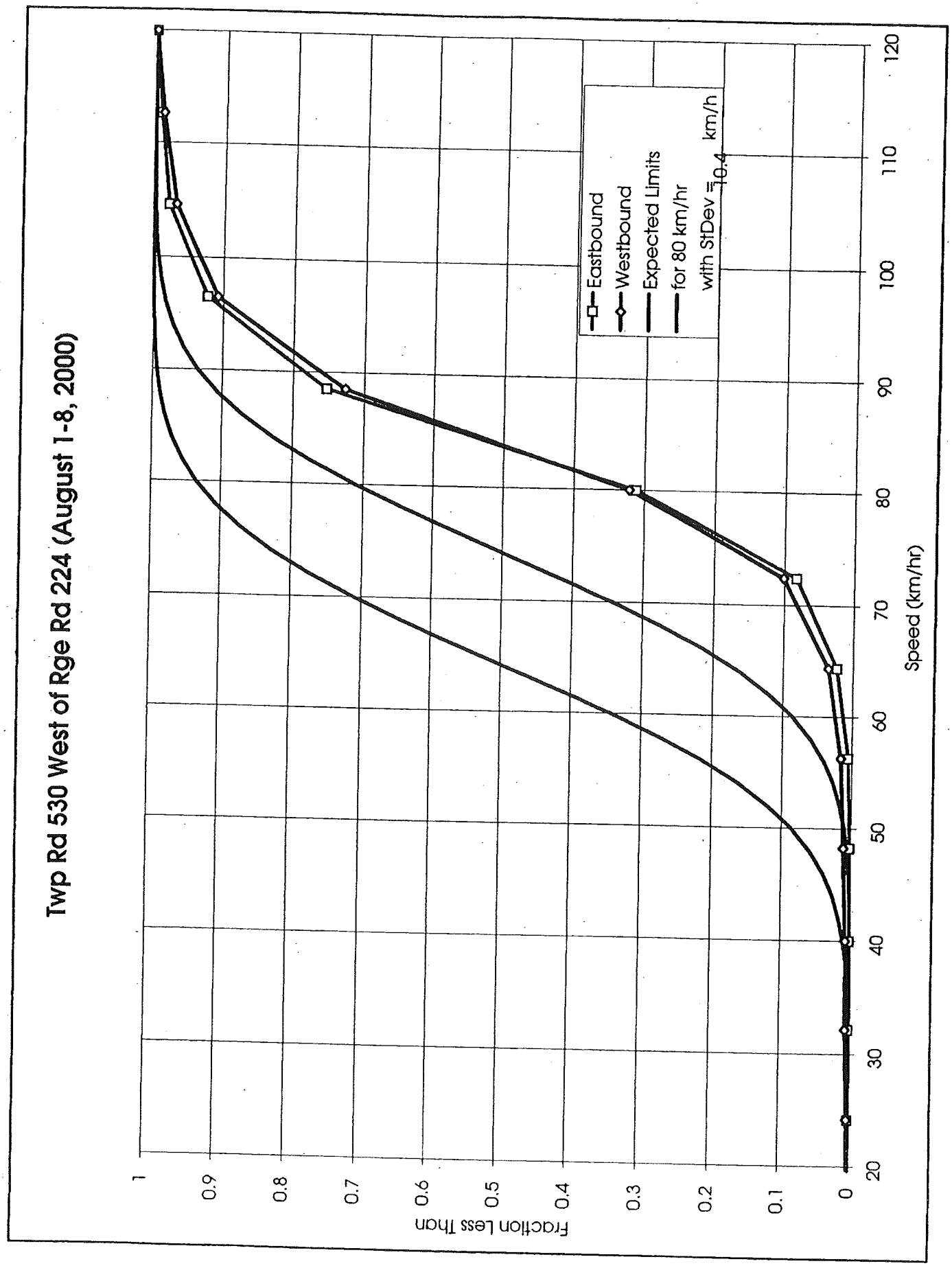
END ME	1-5	6-10	13-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71+	TOTAL	AVERAGE SPEED mph	85th %ILE
1:00	0	0	0	0	0	0	0	3	1	4	10	20	4	1	0	43	54.86	61.74
2:00	0	0	0	0	0	0	0	0	3	2	4	4	5	3	1	22	57.32	66.41
3:00	0	0	0	0	0	0	0	1	0	4	3	2	1	2	1	14	55.50	65.61
4:00	0	0	0	0	0	0	0	0	1	0	2	3	0	3	0	9	58.56	67.32
5:00	0	0	0	0	0	0	0	1	0	0	1	3	1	1	3	10	61.50	72.97
6:00	0	0	0	0	0	0	0	2	0	9	3	1	0	0	1	16	49.88	58.10
7:00	0	0	0	0	0	0	0	0	1	14	10	13	1	4	1	44	54.70	61.86
8:00	0	0	0	2	0	0	0	2	4	14	40	29	11	1	0	103	53.58	61.31
9:00	0	0	0	0	0	0	0	2	4	30	54	20	5	4	1	120	53.08	59.02
10:00	0	0	1	0	0	1	3	8	16	46	73	22	5	0	2	177	50.54	57.85
11:00	0	0	0	0	0	0	1	6	22	59	73	15	13	3	0	192	51.05	57.34
12:00	0	0	0	0	0	0	0	6	39	58	97	23	5	1	0	229	50.42	55.95
13:00	0	0	0	0	0	0	2	4	22	82	133	36	12	0	2	293	51.67	57.21
14:00	0	1	0	0	1	0	0	11	16	77	143	42	13	2	1	307	51.71	58.10
15:00	0	0	0	0	0	0	2	8	32	90	138	45	14	3	0	332	51.43	57.25
16:00	0	0	0	0	0	1	1	5	22	95	199	68	19	1	3	414	52.49	58.00
17:00	0	0	0	0	0	0	2	7	26	112	251	74	31	5	2	510	52.67	58.22
18:00	0	0	0	0	0	1	0	2	8	121	290	101	21	6	4	554	53.26	58.18
19:00	0	0	0	0	0	0	1	4	21	87	213	120	31	7	4	488	53.76	59.43
20:00	0	0	0	0	0	0	3	6	22	77	166	76	28	6	6	390	53.29	59.75
21:00	0	0	0	0	0	0	1	8	12	57	139	57	22	7	2	305	53.34	59.52
22:00	0	0	0	0	0	1	0	2	17	84	109	49	17	3	0	282	52.34	58.00
23:00	0	0	0	0	1	0	0	1	11	39	80	34	12	3	5	186	53.46	60.22
24:00	0	0	0	0	0	0	0	0	7	18	33	17	19	1	3	98	54.94	62.02
TOTALS	0	1	1	2	2	4	16	89	307	1179	2264	874	290	67	42	5138	52.65	58.77

The above summary includes daily data from August 1-8, 2000 (3 weekdays).

SPEED SUMMARY (Westbound)
Twp Rd 530 West of Rge Rd 224 (August 1-8, 2000)
Speed(mph)

ND TIME	1-5	6-10	13-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71+	TOTAL	AVERAGE SPEED mph	85th %ILE
1:00	0	0	0	0	0	0	0	1	2	9	6	8	3	3	2	34	55.21	64.15
2:00	0	0	0	0	0	0	0	0	3	5	4	4	1	0	1	18	52.72	60.77
3:00	0	0	0	0	0	0	0	0	0	2	3	1	0	0	0	6	52.17	56.07
4:00	0	0	0	0	0	0	0	1	1	0	2	2	0	1	1	8	55.50	67.57
5:00	0	0	0	0	0	0	0	1	0	3	5	6	0	0	1	16	54.25	61.94
6:00	0	0	1	0	0	0	0	1	4	12	23	22	6	3	2	74	54.35	56.79
7:00	0	0	1	1	0	0	0	0	13	33	105	61	30	8	7	259	54.91	62.31
8:00	0	0	0	1	0	0	1	3	15	108	224	117	29	11	4	513	53.64	59.47
9:00	0	0	0	0	0	2	0	6	21	103	241	94	19	4	0	490	52.70	57.92
10:00	0	0	1	1	0	1	1	6	36	85	168	75	32	6	6	418	52.78	59.91
11:00	2	0	2	7	7	4	6	17	38	100	155	56	9	7	2	412	49.42	59.32
12:00	0	0	0	4	0	4	3	7	42	120	148	44	9	3	0	384	50.21	57.13
13:00	0	0	0	0	0	0	2	6	19	108	146	61	18	7	2	369	52.38	58.37
14:00	0	0	0	0	2	4	2	15	44	95	154	63	18	8	1	406	51.26	58.47
15:00	2	1	1	4	0	4	6	9	30	82	102	56	13	2	4	316	50.25	59.99
16:00	0	0	0	1	0	4	3	9	18	90	146	57	23	11	4	366	52.45	59.87
17:00	0	0	0	0	0	0	2	5	16	74	153	56	20	4	6	336	53.04	59.27
18:00	0	0	1	0	0	1	1	11	23	87	193	75	24	15	4	435	53.01	59.84
19:00	0	0	0	0	0	0	0	5	15	69	172	93	40	9	4	407	54.25	60.27
20:00	0	0	0	0	0	0	0	5	16	68	136	76	33	12	4	350	54.13	60.57
21:00	0	0	0	1	0	0	1	3	17	48	110	57	26	5	9	277	54.05	61.34
22:00	0	0	0	0	0	0	1	6	19	46	93	33	17	7	4	226	52.96	60.04
23:00	0	0	0	0	0	0	1	3	10	22	48	21	8	0	3	116	52.74	59.67
24:00	0	0	0	0	0	0	1	2	15	19	21	6	6	0	4	74	51.31	59.86
TOTALS	4	1	7	20	9	24	31	122	417	1388	2558	1144	384	126	75	6310	52.57	59.85

The above summary includes daily data from August 1-8, 2000 (4 weekdays).


Twp Rd 530 West of Rge Rd 224 (August 1-8, 2000)
Fraction Less Than
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Speed (km/hr)
20
30
40
50
60
70
80
90
100
110
120
Eastbound
Westbound
Expected Limits
for 80 km/hr
with StDev = 10.4 km/h

APPENDIX D

ROAD SAFETY AUDIT

DRAFT Report

Range Roads 231, 232 and 233 Road Safety Audit

Prepared for:
Strathcona County
2001 Sherwood Drive
Sherwood Park, AB T8A 3W7

Prepared by:
Earth Tech (Canada) Inc.
203 – 4430 Chatterton Way
Victoria, BC V8W 2W7

March 2003

Project No. 52527-03

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RANGE ROADS 231, 232 AND 233
ROAD SAFETY AUDIT

1.0 INTRODUCTION

Strathcona County is experiencing significant growth, particularly in the Urban Service Area which is expected to be fully built out by the year 2016. The County's Municipal Development Plan identifies four areas within Strathcona where a new urban service area may be supported in the future. Two of the potential growth areas are northeast of Sherwood Park and could impact Township Road 530. The other two areas are south of Sherwood Park and could have a bearing Range Roads 231, 232 and 233.

Development in the rural areas of Strathcona County has traditionally been in the form of "country residential" with a density of fifty (50) lots per quarter section. An emerging trend of more intense "estates residential" development has taken root with typical densities in the order of 400 lots per quarter section.

The combination of higher development densities and the potential for a second area of urban development in Strathcona County have prompted the County to review future roadway requirements along Township Road 530 and Range Roads 231, 232 and 233.

By commissioning functional planning studies for these roadways, the County seeks to achieve the following key objectives:

- Identify roadway upgrading needed to rectify existing deficiencies, to accommodate future growth, and to manage access.
- Ensure compatibility with provincial plans for Highway 628.
- Identify stormwater management requirements for each of the roadway corridors.
- Identify how pedestrians and other trail users will be accommodated along the upgraded roadways.
- Identify noise attenuation requirements for each of the upgraded roadways.
- Identify right-of-way requirements to accommodate the recommended roadway cross sections with all related elements such as drainage, utilities, pedestrian facilities and noise attenuation facilities, and,
- Identify an implementation strategy based on the priority of the recommended improvements.

A functional planning study for Range Roads 231, 232, and 233 is presently being undertaken by Earth Tech's Edmonton office. As part of the study, the consultant has implemented a road

safety audit of the project to identify potential safety issues in the planning of the roadways, and make recommendations to treat these deficiencies before road crashes occur on the site.

A road safety audit is therefore a proactive approach to increasing safety and reducing deaths and injuries, ensuring that safety is a consideration throughout the planning and design process. It involves an independent review of the project, and focuses on rod safety aspects of a project exclusively.

Strathcona County is under no obligation to accept any of the safety issues raised by the Project Team. It is understood that with limited budgets, money may be more effectively allocated to other safety improvements not forming part of this safety review. In addition, there may be physical, social or environmental reasons why the identified safety issues cannot be treated at this time.

The safety assessment was carried out by the following project team:

- Steve Nevill, P.Eng. (BC), B.Eng. – Senior Engineer
- Barbara Thomas, P.Eng. (BC) – Senior Traffic Engineer

The initial safety review of the site conditions was carried out on February 13, 2003 during daylight conditions by Steve Nevill, accompanied by Hassan Shaheen, P.Eng., the Project Manager from Earth Tech's Edmonton office. Conditions at the time were dry, cloudy and around -10°C. Subsequent visits to the site were made by Steve Nevill on the evening of February 13, 2003 (light flurries, -12°C) and during the daytime on February 14, 2003 (light flurries, -10°C).

2.0 SCOPE OF WORK

This safety audit covers the existing roadways and proposed preliminary design of Range Roads 231, 232, and 233. The northerly start point for each road is Wye Road, and the southerly end point for each road is Highway 628 (TWP Road 522). The audit's purpose is to examine existing conditions and provide input into the preliminary design with a view to reducing the likelihood of future collisions. The road safety audit is intended to highlight safety issues which, if treated, have the potential to increase safety.

The road safety audit focused on the road safety aspects of the design only and did not address detailed capacity or environmental factors. The safety needs of all road users were addressed by highlighting design issues that could contribute to collision occurrence and severe injuries. In particular, the audit considered vulnerable road users such as cyclists, pedestrians, children, the elderly, and the visually and mobility impaired. Broad recommendations were made (as required) to treat the potential safety issues identified in the review process.

Earth Tech's methodology for this road safety audit process followed best practice as laid down by the Road Improvement Strategies Program of the Insurance Corporation of British Columbia in its document "Introducing Road Safety Audits and Design Safety Reviews" (1998), and from international experience of the UK, notably from the Institute of Highways and Transportation in its document "Guidelines for the Safety Audit of Highways" (1996).

3.0 SAFETY AUDIT PROCESS

The safety audit was undertaken on the preliminary designs prepared by Earth Tech in February 2003. Also reviewed were the drawings contained in the Functional Planning Study – Range Roads 231, 232 and 233, Draft Report, prepared by Earth Tech and dated December 20, 2002. Typically on preliminary designs, the following features are examined:

- Horizontal and vertical alignment,
- Intersection location and control, sight lines,
- Human factors,
- Conflict points,
- Facilities for pedestrians and cyclists,
- Provisions for turning traffic,
- Merging and diverging operations,
- Compatibility with adjacent road network, and
- Provision for unusual aspects of traffic composition or environment including weather.

The following issues are normally covered at the detailed design stage and as such, are excluded here: roadside hazards such as trees or utility poles, lane widths at specific locations, intersection corner radii, road signs, pavement markings, lighting and signal details, landscaping, and protective aids such as crash attenuators and roadside barrier, and road drainage.

4.0 SAFETY REVIEW OF RANGE ROAD 231

4.1 Existing Conditions

Site visits to Range Road 231 were conducted on three separate occasions, twice in the daytime and once in the evening. During those site visits, the following safety issues were noted.

Four-lane to two-lane transition south of Wye Road

Southbound two-to-one merge seems short. TAC guidelines suggest 100 to 175 metres of parallel lane followed by 100 metres of taper. Northbound diverge seems abrupt.

- Consider extending two southbound lanes further south before merging. This may impact southerly accesses. Extended southbound merge lanes can be expected to reduce the likelihood of sideswipe and rear end collisions.

- Consider softening northbound diverge. This may be accomplished by lengthening tapers or by developing a median width, which could be re-apportioned on approach to the intersection. Softened taper rates can be expected to reduce run-off-road collisions.

Left turn lane developments

Left turn lane lengths appeared too short to accommodate deceleration and storage of vehicles. For posted speeds of 80 km/h, TAC recommends a desirable left turn length of 270 m. This accommodates 30 metres of storage and full deceleration within the parallel lane. At minimum, TAC recommends 185 metres which permits 30 metres of storage and deceleration within the taper and start of parallel lane. It is preferable to develop left turn lanes around centreline rather than offset; this improves sight distance for turning vehicles and navigation through the intersection.

Left turn lane developments for various intersections were measured to be:

- Thomson Road 100 metres
- Thomson Drive 110 metres
- Windsor Drive 110 metres
- Windsor Drive/Sconadale 110 metres approximately
- Deer Mountain Trail 100 metres approximately

Suggested revisions include:

- Consider providing left turn storage and deceleration lengths for posted speed limits as per TAC guidelines. Storage requirements should be calculated based on future demand volumes. Additional deceleration and storage lengths can be expected to reduce the likelihood of rear end collisions on the main roadway, and rear end collisions in the left turn lane itself.

- Consider providing continuous median width between the two Windsor Drive accesses, which would convert to dedicated left turn slots at the accesses. A continuous median width may reduce the likelihood of head-on collisions between opposing directions of

traffic, and may reduce driver task workload by eliminating the horizontal adjustments associated with turn slot development.

Speeding

Anecdotally, speeding has been indicated as a problem. No specific measures of travel speeds were taken during the site visits. However, there are design techniques available which help to control speeding. The one most applicable to this project is re-apportioning lane widths so that overall width is maintained but travel lanes are narrower and shoulder lanes are wider. This creates the illusion of having narrower room to maneuver, thus discouraging drivers from speeding.

- Consider using 3.5-metre paved lanes with 1.3-metre paved shoulders to provide 4.8 metres in total paved width. TAC recommends using 2.5-metre shoulder for 80 km/h; however, this may be reduced in this instance where alternative, dedicated routing for pedestrians and cyclists is being proposed.

Sconadale/Windsor Drive Intersection

This location was felt to have shortened sight distance. The slope of the side street in combination with the vertical curve of Range Road 231 seems to reduce sight distance and limits driver comfort in decision-making. Field observation and plan drawings indicate about 200 metres of sight distance are available. For turning sight distance, TAC recommends 250 metres at 80 km/h, but the 200-metre distance is considered sufficient under AASHTO methodology.

Usually, left turns from a stopped condition on a minor road are considered to require an 8-second gap in traffic. If the 200 metres of sight distance are equivalent to eight seconds or less, then the vehicle on Range Road 231 must be travelling at 90 km/h or higher. This suggests that if vehicles on Range Road 231 are travelling at speeds in excess of 90 km/h at this intersection, drivers on the side street may have difficulty judging a safe gap in through traffic.

- Consider measuring actual travel speeds at this location and determining the required sight distance for vehicles turning left from the side streets. In the long term, consider lowering the crest of the vertical curve of Range Road 231 in order to increase sight distance for side street traffic. These measures may help reduce side street traffic conflicts including angle and left turn crossing collisions.

Access Frequency

A number of private accesses were observed, but most were anticipated to carry very low volumes of traffic except the commercial accesses at the northerly end of Range Road 231. The proposed preliminary design shows the relocation or closure of some of these accesses.

- Consider implementing an access management plan for the length of the roadway, to proactively deal with anticipated future development by promoting shared access, access from side streets, and all reasonable alternatives to direct access to Range Road 231.

4.2 Proposed Preliminary Design

The proposed preliminary design was reviewed as shown on Earth Tech drawings dated February 2003. Notable safety issues are presented below.

Wye Road Intersection

Southbound from Wye Road, it appears that the left hand or "fast" lane must merge with the right hand curbside lane. This is an unusual practice. More routinely, the right hand curbside lane merges left. By contradicting driver expectation, driver task workload and confusion increase, thereby increasing the likelihood of conflicts and collisions related to this maneuver.

- Consider revising the currently proposed left lane merge to a right lane merge condition.

Sconadale/Windsor Drive

The proposed northbound left turn lane should mitigate the potential for rear end collisions involving northbound vehicles turning left from Range Road 231. With advance intersection signing, generous taper rates, deceleration zones and storage lengths, conflicts related to left turning vehicles should be minimized. Storage requirements should be based on future demand.

- Consider revising the vertical curve to increase turning sight distance for side street traffic.

Access frequency

Nine accesses are closed or relocated. The turning movements are proposed to be consolidated between properties or to named roads. Driver expectation is that turning movements will be made at conspicuous accesses. Relocating turning movements to shared accesses or named roads increases the likelihood that drivers will expect turning movements. This can be expected to improve safety by reducing the likelihood of rear end conflicts.

- Consider providing median refuge width or left turn slots for all accesses.

Left turn lane developments

Left turn lanes are proposed at all five named roads. This will reduce the likelihood of collisions related to left turn maneuvers including rear end, left turn opposing, and sideswipe collisions.

- Consider providing sheltered left turn lanes where slots must be located along or at the bottom of grades. This design is shown in TAC guidelines, Figure 2.3.8.5 (b). These left turn lanes cause restricted sight distance so this must be examined as a trade-off to the allowable run-out distance provided. The run-out distance may be necessary under slippery road conditions.

5.0 SAFETY REVIEW OF RANGE ROAD 232

5.1 Existing Conditions

Site conditions were examined along Range Road 232 at the February site visits. The following safety issues were identified.

Wye Road Intersection

Southbound lanes on Range Road 232 were discontinuous through Wye Road intersection; the right hand curbside lane ends abruptly at Wye Road. In conflict with this, a second primary signal head is in position for southbound traffic. The right hand lane was covered in undisturbed snow indicating drivers were not using the right hand lane at the time of the site visit. It is noted that this lane is continued through the intersection in the preliminary design.

Two-to-one southbound merge conditions south of Wye Road

As mentioned for Range Road 231, TAC recommends a minimum taper length of 100 metres for merging operations.

- Consider increasing taper length to 100 metres for southbound merging lanes.

- Consider relocating two-to-one southbound merge. Options include merging from Station 3+000 to Station 2+900, or, merging from Station 2+600 to Station 2+500 (this will depend on the chosen treatment of the Salisbury Greenhouses access). Relocating the merging operation will reduce the driver task workload thereby improving the likelihood that the merging maneuver will be completed safely.

  If the southbound merge lane is relocated to Station 3+000, it may be reasonable to provide a taper for the southbound right turns at the west leg of Estate Drive.

  Alternately, the right hand curbside lane could become a right turn drop lane at Estate Drive. This will depend on southbound traffic volumes. Advance signing of this condition is preferable.

Salisbury Greenhouses

At the time of the site visit, most users were headed to or from the north, and were consequently using the northerly business access. Because the northerly access is located just

south of the raised median for Estate Drive, southbound drivers may brake suddenly to complete their left turn into Salisbury Greenhouses.

- Consider providing a southbound left turn slot for the northerly access since demand appears to prefer this access. This could be accomplished with a two-way left turn lane or back-to-back left turn slots with Estate Drive. Alternately, prohibit left turns in here with a raised median and focus all movements at the southerly access by providing a southbound left turn lane there; this would leave the northerly access as right in/right out. These revisions would enhance safety by concentrating turning movements at an expected location.

- Depending on the access decision, the southbound two-to-one merge should be located accordingly to minimize driver task workload.

Private Access at Station 3+130

This access is located approximately 90 metres south of northbound Wye Road stop bars. Its location limits the opportunities to lengthen the northbound left turn slot for Wye Road. The proposed preliminary design provides a protected left turn lane with raised median.

- Consider collecting traffic count and origin/destination data for this intersection; westbound to southbound left turns may be low volume and therefore, it may be possible to restrict this movement.

Left turn lane developments

- Left turn lanes appeared shorter than standard during the site visit. As suggested for Range Road 231, consider providing at least 185 metres of parallel lane to allow deceleration and storage within the left turn length.

Access management

- As per Range Road 231, consider implementing an access management plan for this road to proactively address accesses for future developments.

5.2 Proposed Preliminary Design

Private Access at Station 3+130

Consider providing a two-way left turn slot for approximately 100 metres at this location. This will allow entrance and egress from this site with a median refuge. Alternately, consider providing a protected left turn area out of the private drive westbound to southbound. If westbound to southbound volumes are considered low, restriction of this access to left in/right in/right out may be reasonable.

Consider narrowing the intersection design such that less undefined pavement is available at the intersection, unless traffic mix and turning movement templates require the approximate 30-metre opening.

Raised medians

If raised medians are implemented, consider providing offset, asymmetric terminuses for on-coming traffic. This will provide a small flare for on-coming traffic which will help to minimize the consequence of a collision with the raised medians.

Consider using narrow raised medians at Estate Drive to allow left turn drivers to see around opposing left turn vehicles.

Consider using painted medians at Central Drives north and south near Yorkley. This will provide a refuge for difficult stopping under icy road conditions similar to a sheltered left turn lane.

Lane widths

Consider using 3.5-metre through lanes and 1.3-metre shoulders to discourage speeding. As for Range Road 231, the separate dedicated pathway for pedestrians and cyclists reduces the need for significant shoulder width

6.0 SAFETY REVIEW OF RANGE ROAD 233

6.1 Existing Conditions

During the site visits in February, certain safety issues arose that were similar to those on Range Roads 231 and 232. The similar issues are presented here in summary. Additional issues are covered in more detail.

Left turn lane development

- As per Range Roads 231 and 232, consider lengthening the parallel lanes to include deceleration and storage lengths.

Access management

Private accesses are numerous. The preliminary plan proposes to relocate or close ten of these accesses. Additionally, we would suggest:

- Consider access management for the accesses located between Stations 2+380 and 2+540.
- Consider relocating northbound diverge lane north beyond the private access at Station 2+540.

Two-to-one southbound merge conditions south of Wallace Drive

- Consider lengthening to 100 metres.

Pedestrian facilities

During the site visit, pedestrians were observed walking along Range Road 233 because the sidewalks and shoulders were covered in snow. This increases the risk of vehicle/pedestrian conflicts and collisions.

- Consider snow removal for sidewalks and shoulders known to have significant pedestrian volumes.

6.2 Proposed Preliminary Design

Ordze Road intersection

The proximity to Wye Road makes signalization less than ideal, few realistic options exist. To minimize the traffic congestion and related conflicts and collisions, it is suggested that synchronization of the signals and queue overflow induction loops be implemented.

Drawing dated February 13, 2003, Wye Road to South Avenue

- Consider moving northbound diverge north of South Avenue. Options include bringing on the northbound lane for right turning movements westbound to northbound. This will reduce the conflict between right turners headed northbound to eastbound at South Avenue and northbound through traffic on Range Road 233. A direct taper may be considered for northbound to eastbound right turns at South Avenue.

- Consider providing narrower median widths (approximately 1.0 metres) to allow left turning drivers to see around opposing left turn traffic.

Drawing dated February 2003 for Access Changes on Range Road 233

- Consider implementing Alternative 2 (Exhibit 4.6) which reduces the frequency of access along Range Road 233, thereby reducing the potential for rear end and turning movement conflicts.

Lane widths

- Consider using reduced through lane width of 3.5 metres and shoulders of 1.3 metres to discourage speeding.

Auxiliary lanes

- Consider adding auxiliary lanes "post" intersections rather than "pre" intersections. This reduces the conflicts between right turn traffic destined for the near intersection and through or left-merge traffic heading straight ahead.

7.0 ADDITIONAL CONSIDERATIONS

Raised versus painted medians

Raised medians are generally used where an environment more constraining to drivers is needed or preferred. TAC provides a listing of the advantages and disadvantages for each median type in Section 2.3.6.

- Consider using raised medians with semi-mountable curbs in the lower speed suburban/urban areas with lighting, and appropriate signing and island flashers. Consider using painted medians in higher speed, rural areas.

- If medians are required in high-speed areas, consider using concrete median barrier which provides vehicle redirection; take care to ensure adequate sight distance if concrete median barrier is introduced. Concrete median barrier may require crash attenuation.

Lighting

Lighting was not reviewed as part of this audit. It should be carefully considered at the detailed design stage to ensure adequate illumination is provided for the proposed sidewalks along Range Roads 231, 232, and 233.

Details surrounding the proposed sidewalks

- The sidewalks proposed parallel to Range Roads 231, 232, and 233 will enhance the pedestrian and cyclist experience. To encourage usage, consider illumination, snow removal, and well-marked crossings of side streets.

Laning for side streets

- In general, side streets were shown schematically as two-way, two-lane approaches. Consider providing left turn slots on side streets that will service significant development volumes. Left turn slots reduce conflicts between left turning traffic and other users, and increase capacity and operational flexibility.

Snow accumulation in medians

Snow can accumulate in medians, either raised or painted. This can limit turning and crossing sight distance.

- Consider implementing a regular program of reviewing sight distance at major intersections and, removing snow when snow has accumulated beyond a specific depth and/or sight distance has decreased to an unacceptable length.

Passing conditions

Passing conditions were not specifically addressed with this safety review.

- Consider reviewing passing requirements and implementing passing opportunities if necessary.

8.0 SUMMARY

For all three range roads, the following features are likely to reduce future conflicts and collisions:

- Generous left turn deceleration and storage lane lengths
- Generous two-to-one merge conditions
- Dedicated turn lanes, either right or left
- Access management, short and long term
- Reduced horizontal adjustments by use of continuous median width
- Separate dedicated pedestrian and cyclist pathways
- Adequate but not excessive sight distance
- Cross section features that discourage speeding but provide adequate width for safe passage

Collision frequencies and rates are likely to be lower by implementing these features than without them.

APPENDIX E

SOUND LEVEL CALCULATION

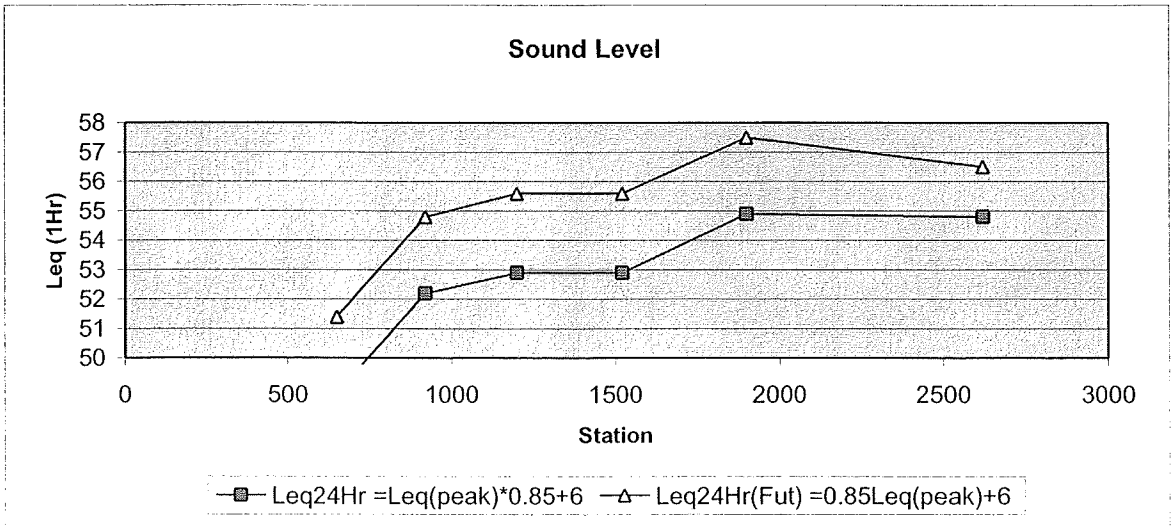
Appendix: Sound Level Calculation
Strathcona County
Range Road 231

Threshold Noise Level = 65 dBA for Roadway Capacity

Type of Road - Asphalt Concrete Surface
Wood Type mixed
Phi values = 70
Receiver Height 1.5m Above GL
Assumptions:
Directional Split 75/25 Strathcona County
Light Vehicle 90%
Medium Truck 5%
Heavy Truck 5%
Flat land
Road level and back yard same level

						PEAK VOLUME			
Station	Location of House	Source and Receiver Distance (m)	Wood Type	Traffic Volume(2001) AADT	Future Traffic Volume 2016 AADT	Leq(Peak) 2001	Leq24Hr =Leq(peak)*0.85+6	Leq(peak) 2016	Leq24Hr(Fut) =0.85Leq(peak)+6
2620	E	56	1	7100	11200	57.4	54.8	59.4	56.5
1900	W	37	1	3600	7400	57.5	54.9	60.6	57.5
1520	W	51	0	3600	7400	55.2	52.9	58.3	55.6
1200	W	51	0	3600	7400	55.2	52.9	58.3	55.6
920	W	55	1	3300	6800	54.3	52.2	57.4	54.8
650	E	95	1	3300	6800	50.4	48.8	53.4	51.4

Source located at centre of Road
Wood Type :
0 No trees
1 Trees < 30m
2 30 to 60m
3 > 60m



Appendix: Sound Level Calculation
Strathcona County
Range Road 232

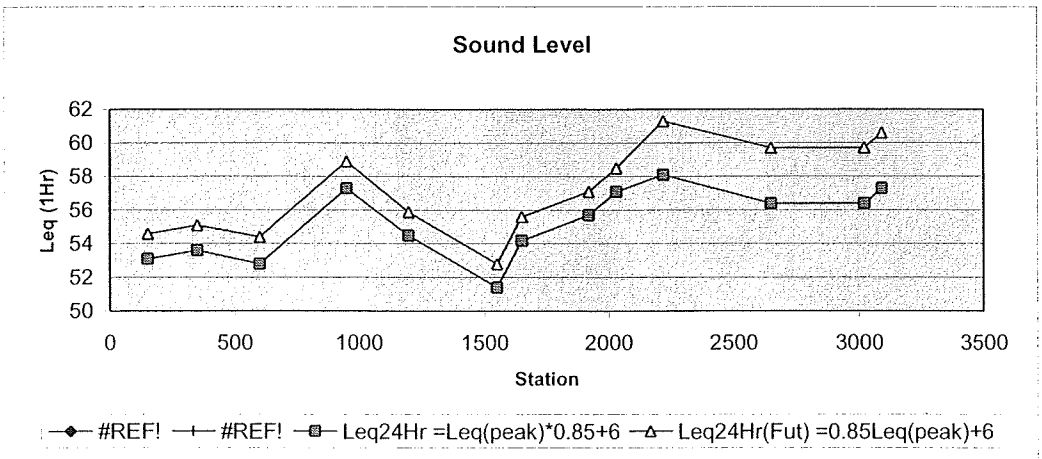
Threshold Noise Level = 65 dBA for Roadway Capacity

Type of Road - Asphalt Concrete Surface
Wood Type mixed
Phi values = 70
Receiver Height 1.5m Above GL
Assumptions:
Directional Split 75/25 Strathcona County
Light Vehicle 90%
Medium Truck 5%
Heavy Truck 5%
Flat land
Road level and back yard same level

Range Road 232

						PEAK VOLUME			
Station	Location of House	Source and Receiver Distance (m)	Wood Type	Traffic Volume (2001) AADT	Future Traffic Volume, 2016 AADT	Leq(Peak) 2001	Leq24Hr =Leq(peak)*0.85+6	Leq(peak) 2016	Leq24Hr(Fut) =0.85Leq(peak)+6
3090	E	40	0	7900	19400	60.3	57.3	64.2	60.6
3020	E	46	0	7900	19400	59.3	56.4	63.2	59.7
2650	E	46	0	7900	19400	59.3	56.4	63.2	59.7
2220	E	35	0	7900	19400	61.3	58.1	65.1	61.3
2030	W	28	1	4100	6200	60.1	57.1	61.8	58.5
1920	E	35	0	4100	6200	58.5	55.7	60.1	57.1
1650	E	45	1	4100	6200	56.7	54.2	58.3	55.6
1550	W	71	1	4100	6200	53.4	51.4	55	52.8
1200	W	43	1	4100	6200	57	54.5	58.7	55.9
950	W	25	0	3700	5600	60.4	57.3	62.2	58.9
600	W	52	1	3700	5600	55.1	52.8	56.9	54.4
350	E	46	1	3700	5600	56	53.6	57.8	55.1
150	W	50	1	3700	5600	55.4	53.1	57.2	54.6

Source located at centre of Road
Wood Type :
0 No trees
1 Trees < 30m
2 30 to 60m
3 > 60m



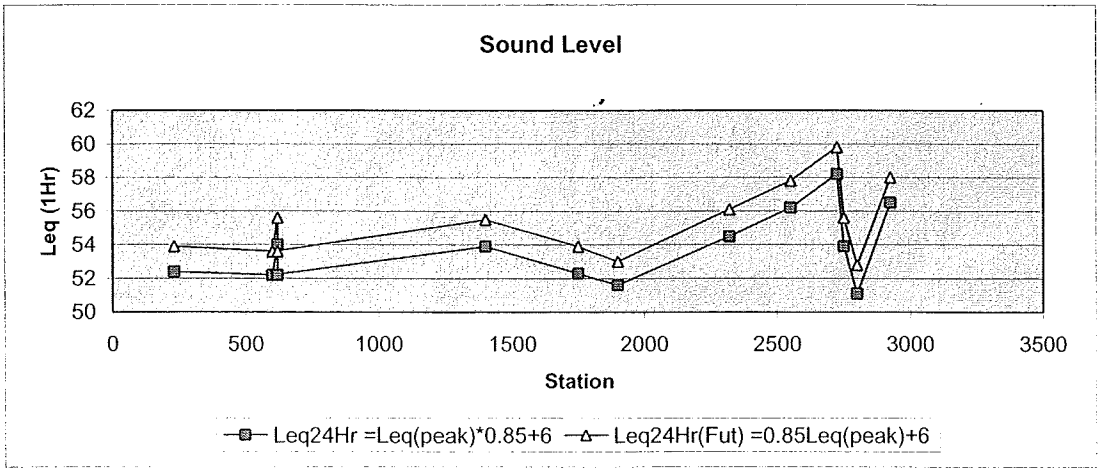
Appendix: Sound Level Calculation
Strathcona County
Range Road 233

Threshold Noise Level = 65 dBA for Roadway Capacity

Type of Road - Asphalt Concrete Surface
Wood Type mixed
Phi values = 70
Receiver Height 1.5m Above GL
Assumptions:
Directional Split 75/25 Strathcona County
Light Vehicle 90%
Medium Truck 5%
Heavy Truck 5%
Flat land
Road level and back yard same level

						PEAK VOLUME			
Station	Location of House	Source and Receiver Distance (m)	Wood Type	Traffic Volume(2001) AADT	Future Traffic Volume(2016) AADT	Leq(Peak) 2001	Leq24Hr =Leq(peak)*0.85+6	Leq(peak) 2016	Leq24Hr(Fut) =0.85Leq(peak)+6
2925	E	40	0	6400	9700	59.4	56.5	61.2	58
2800	E	95	1	6400	9700	53.1	51.1	55	52.8
2750	W	60	0	6400	9700	56.4	53.9	58.3	55.6
2725	E	30	0	6400	9700	61.4	58.2	63.3	59.8
2550	E	42	0	6400	9700	59	56.2	60.9	57.8
2320	W	55	0	6400	9700	57.1	54.5	58.9	56.1
1900	W	80	0	5300	8000	53.6	51.6	55.3	53
1750	W	70	1	5300	8000	54.5	52.3	56.3	53.9
1400	E	54	0	5300	8000	56.4	53.9	58.2	55.5
600	W	68	1	4800	7200	54.3	52.2	56	53.6
620	E	50	1	4800	7200	56.5	54	58.3	55.6
620	W	68	0	4800	7200	54.3	52.2	56	53.6
230	E	65	1	4800	7200	54.6	52.4	56.4	53.9

Source located at centre of Road
Wood Type :
0 No trees
1 Trees < 30m
2 30 to 60m
3 > 60m



SER-009-027	Strathcona County Municipal Policy Handbook

Urban Traffic Noise

Date Approved by Council: **12/08/92**
Resolution No: **1079/92**
Lead Role: **Chief Commissioner**
Replaces: **N/A**
Last Review Date: **12/92**
Next Review Date: **12/96**

Administrative Responsibility: **Engineering & Environmental Planning**

Special Notes:

Policy Statement

Attenuation of Traffic Noise for Proposed New Residential Development

A Noise Impact Assessment, satisfactory to the County Engineer is required for all residential development to be constructed within the vicinity of existing and proposed major roadways. The vicinity is deemed to be a depth of two residential lots and will be the nearest residential lots to the roadway regardless of commercial, light industrial or green space screening. The assessment must address background noise levels, the impact of current traffic levels and the impact of traffic at projected road design capacity. The assessment will identify the attenuation measures necessary to meet the approved maximum noise standards.

The recommended maximum outdoor noise level criterion will be 60dBA* 5 metres from the rear facade of the dwellings. Developers will be required to provide an initial design for a 55 dBA maximum noise level. The County Engineer, at his sole discretion, may relax the design in the interests of practicality, however, under no circumstances shall the attenuation measures as designed permit greater than 60 dBA at design road capacity 5 metres from the facade of the nearest dwellings.

The Developer shall construct or provide funds for the construction of the attenuation measures to meet the presently foreseen ultimate road operating at capacity. If the Developer chooses to provide funds for future attenuation to meet the ultimate design, the developer must construct the appropriate combination of berms and attenuation barriers to achieve the attenuation needed for the 15 year horizon as established by the County Engineer.

*All noise levels quoted refer to Leq (24 hr.) values.

The developers of any multi-storey residences planned for "the vicinity" of a major roadway must provide effective attenuation to the eave line of the building ie. .5 metres above the top of the upper most windows.
The minimum attenuation measure acceptable for the 15 year horizon is a 2 metre high close boarded fence. At the sole discretion of the County Engineer this may be relaxed in circumstances where the vicinity of the house is screened from the roadway by sufficient vegetation to provide a design noise level no greater than 55 dBA 5 metres from the nearest dwelling's facade. The screening property must be municipal reserve, environmental reserve, public utility lot or other such designation or use that would not reasonably be expected to change during the design life of the dwellings. Where berms are required in the ultimate design they must be constructed as part of the initial measures prior to the issuance of building permits for any phase of the affected development.

Unless the major road is otherwise designated the developer should plan for the construction of a berm in accordance with County Engineering Standards and said berm is to be used as the base for any additional attenuation measures required.
Wherever possible absorptive will be preferred over reflective noise attenuation measures.

Achievement of C.M.H.C. recommended noise levels inside buildings is not controllable by the County. Home owners concerned about these noise levels are expected to take their own mitigative measures. If requested, the County Engineer may authorize home interior testing for the determination of the building attenuation measures required.

All measures necessary to meet these standards will be the responsibility of the developer.

Attenuation of Traffic Noise for Existing Residential Areas

Where the County is providing retrofit noise attenuation for residential neighbourhoods no measures will be undertaken until the measured noise levels 5 metres from the rear facade of the dwelling exceed 65 dBA

No protection will be provided for second or subsequent storeys of houses unless such protection can be achieved by a maximum of a 2.5 metre wall on the existing grades at the road right-of-way limit.

In areas where the 65 dBA noise level is exceeded, Council will consider the construction of such noise attenuation measures as deemed appropriate by Administration in such priority as is consistent with the availability of funds.

Residents may, in accordance with the Municipal Taxation Act, petition for the construction of noise attenuation measures at any time on a 100% local improvement charge basis. The residents will be assisted by County staff in the determination of the design and estimated cost of such an attenuation device. As part of the petition, all residents adjacent to the property line on which the

facility will be constructed must sign a working easement agreement prior to implementation of the project.

Procedures

REDUCTION OF TRAFFIC NOISE FOR PROPOSED NEW RESIDENTIAL DEVELOPMENT

Background

The Strathcona County Traffic Noise Policy for the urban service area has been based on a consultant study undertaken by Associated Engineering Ltd. and Bolstad Engineering Associates Ltd. completed in 1991. The study was commissioned in order to determine the appropriate level of noise attenuation measures to be expected of developers and to be expected for the mitigation of noise for existing residents.In the past, Alberta Transportation's Basic Capital Grants have been used to support the construction of noise attenuation devices. Noise attenuation is not fundable when it is required on a road which:

a) falls within the known arterial network and
b) will consist of the number of basic lanes ie. four or six, as was intended by the known arterial network.

Where future noise attenuation construction is fundable, Administration will recommend what percentage if any of the cost should be grant supported consistent with the need to firstly maintain our existing transportation infrastructure and services, and secondly to provide infrastructure in support of development.

The following procedures relate to the method by which the policy shall be implemented.

Definitions

1. Sound Level Descriptor

   The sound level descriptor to be used in all assessments will be the 24 Hour Energy Equivalent Sound Level or Leq (24 Hour) expressed in A-weighted decibels or dBA.

   Forecast traffic noise will be determined directly in terms of Leq (24 hour), for a minimum of 15 years in the future, and compared to the Outdoor Criterion Sound Level.

2. Determination of Traffic Noise Level

   Traffic noise levels will be estimated using the Strathcona County Traffic Noise Prediction Model. When traffic noise predictions are made, print-outs from the model containing the input data and predicted sound levels will be attached to the Noise Impact Statement for consideration and acceptance by the County. Electronic "reports" will also be acceptable if compatible with County equipment and systems.

The traffic volumes used for the noise prediction will be the ultimate traffic capacity of the roads envisaged in the County Transportation Plan. Percentages of medium and heavy trucks for use in the model will be based on existing traffic counts.

3. Outdoor Criterion Levels are as follows:

Design objective 55 dBA*

* Under extenuating circumstances and at the discretion of the County Engineer, the design noise level may be relaxed; however, it will not be permitted to exceed 60 dBA.

Procedures

1. County Engineering staff will identify, based on traffic projection models, truck route designations and the noise attenuation formula, those major roadways for which noise attenuation measures will be required prior to initial residential construction.

2. Developers at the ASP stage are required to provide, as part of their Transportation Study, a Noise Impact Assessment and preliminary design of both initial and ultimate noise attenuation measures. Where such assessments have not yet been provided as part of an Area Structure Plan they must be provided prior to the approval of any further subdivisions that have a boundary within 300 metres of an existing or proposed major roadway right-of-way.

3. When the Transportation Study and Noise Impact Analysis are acceptable to the County Engineer the collector roadway designation and preliminary noise attenuation plan will be approved subject to the zoning being consistent with the design.

4. The Land Development Coordinator will ensure that the noise attenuation measures including all berms and such other measures as necessary for the initial 15 year horizon are constructed prior to the issuance of any development permits within 300 metres of the boundary of a major roadway. When the noise attenuation measures can not be constructed due to seasonal delay, the County Engineer may recommend that permits be issued provided the construction of such noise attenuation measures are committed for the beginning of the following season.

5. When land development precedes the construction of the arterial road, the Land Development Coordinator will ensure that securities are retained for the cost to construct the 15 year horizon requirement and the ultimate design.

REDUCTION OF TRAFFIC NOISE FOR EXISTING RESIDENTIAL AREAS

Procedures

1. By June 1993, Strathcona County Public Works staff will complete the predictor model

analysis for each block adjacent to an existing major roadway for both existing traffic and the 15 year projected horizon. Noise tests will be conducted where existing predicted noise levels are in excess of 65 dBA. The noise levels 5 metres from the rear facade of a dwelling will be calculated and the noise levels at the point calculated will be measured to determine the effectiveness of existing attenuation features.

If the measured values adjusted for annual average daily traffic (AADT) are greater than 65 dBA, Public Works staff will prepare a design based on site characteristics, effectiveness of various measures, present and future noise levels and daily noise level distribution for implementation dependent on the availability of funds.

2. Where residents would prefer a noise attenuation facility in advance of the County's ability to provide it, they may petition for same on a local improvement charge basis under the Municipal Taxation Act.

3. Where residents would prefer a more expensive attenuation measure than that proposed by the County, they may petition on a local improvement charge basis to pay the difference in cost for the enhanced facility.



SR009027.WP

APPENDIX F

INTERSECTION ILLUMINATIONS

Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

This spreadsheet is to be used in conjunction with *Illumination of Isolated Rural Intersections* , Transportation Association of Canada, February 2001.

Please enter information in the cells with yellow background

INTERSECTION CHARACTERISTICS

Range Road 231	Main Road
Thomson Road	Minor Road
Sherwood Park	City/Town

Date: August 14, 2003

Other: i.e. source of intersection information

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	0.5	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	4	2	3	Number of legs = 3 or more	OK	6
					Geometric Factors Subtotal	**51**

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	7100	4	10	Either Use the two AADT inputs **OR** the Descriptive Signalization	OK	40
AADT on Minor Road (2-way)	315	0	20	Warrant (Unused values should be set to Zero) Refer to Table	OK	0
Signalization Warrant	Descriptive	0	30	1(B) for description and rating values for signalization warrant.	OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
					Operational Factors Subtotal	**60**

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
					Environmental Factor Subtotal	**0**

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of all night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
					Collision History Subtotal	**0**

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY

Geometric Factors Subtotal	51
Operational Factor Subtotal	60
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	111

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

This spreadsheet is to be used in conjunction with *Illumination of Isolated Rural Intersections* , Transportation Association of Canada, February 2001.

Please enter information in the cells with yellow background

INTERSECTION CHARACTERISTICS

Range Road 231	Main Road
Thomson Ave.	Minor Road
Sherwood Park	City/Town

Date: August 14, 2003

Other: i.e. source of intersection information

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	2.2	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	3	1	3	Number of legs = 3 or more	OK	3
				Geometric Factors Subtotal		48

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	3600	3	10	Either Use the two AADT inputs **OR** the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	30
AADT on Minor Road (2-way)	315	0	20		OK	0
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
				Operational Factors Subtotal		50

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
				Environmental Factor Subtotal		0

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of all night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
				Collision History Subtotal		0

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY

Geometric Factors Subtotal	48
Operational Factor Subtotal	50
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	98

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

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INTERSECTION CHARACTERISTICS

Range Road 231	Main Road	Date	August 14, 2003
Windsor Dr.	Minor Road	Other	i.e. source of intersection information
Sherwood Park	City/Town		

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	0.2	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	4	2	3	Number of legs = 3 or more	OK	6
				Geometric Factors Subtotal		51

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	3800	3	10	Either Use the two AADT inputs OR the Descriptive Signalization	OK	30
AADT on Minor Road (2-way)	280	0	20	Warrant (Unused values should be set to Zero) Refer to Table	OK	0
Signalization Warrant	Descriptive	0	30	1(B) for description and rating values for signalization warrant.	OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
				Operational Factors Subtotal		50

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
				Environmental Factor Subtotal		0

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter either the annual frequency (See Table 1(C), note #4)	OK	0
OR				OR the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of all night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
				Collision History Subtotal		0

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY	
Geometric Factors Subtotal	51
Operational Factor Subtotal	50
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	101

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

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INTERSECTION CHARACTERISTICS

Range Road 231	Main Road
Windsor Dr./Scondale Rd	Minor Road
Sherwood Park	City/Town

Date: August 14, 2003

Other: i.e. source of intersection information

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	4.1	2	3	Rounded to nearest tenth of a percent	OK	6
Number of Intersection Legs	4	2	3	Number of legs = 3 or more	OK	6
				Geometric Factors Subtotal		57

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	3800	3	10	Either Use the two AADT inputs OR the Descriptive Signalization	OK	30
AADT on Minor Road (2-way)	280	0	20	Warrant (Unused values should be set to Zero) Refer to Table	OK	0
Signalization Warrant	Descriptive	0	30	1(B) for description and rating values for signalization warrant.	OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
				Operational Factors Subtotal		50

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
				Environmental Factor Subtotal		0

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter either the annual frequency (See Table 1(C), note #4)	OK	0
OR				OR the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of all night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
				Collision History Subtotal		0

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY

Geometric Factors Subtotal	57
Operational Factor Subtotal	50
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	107

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

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INTERSECTION CHARACTERISTICS

Range Road 231	Main Road	Date	August 14, 2003
Deer Mountain Access	Minor Road	Other	i.e. source of intersection information
Sherwood Park	City/Town		

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	Y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	1.8	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	4	2	3	Number of legs = 3 or more	OK	6
				Geometric Factors Subtotal		51

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	3300	3	10	Either Use the two AADT inputs **OR** the Descriptive Signalization	OK	30
AADT on Minor Road (2-way)	580	1	20	Warrant (Unused values should be set to Zero) Refer to Table	OK	20
Signalization Warrant	Descriptive	0	30	1(B) for description and rating values for signalization warrant.	OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
				Operational Factors Subtotal		70

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
				Environmental Factor Subtotal		0

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of all night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
				Collision History Subtotal		0

Check Intersection Signalization:
Intersection is not Signalized

ILLUMINATION WARRANTED
REVIEW SITE AND COLLISIONS TO DETERMINE LIGHTING TYPE (PARTIAL OR DELINEATION)

SUMMARY

Geometric Factors Subtotal	51
Operational Factor Subtotal	70
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	121

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

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INTERSECTION CHARACTERISTICS

Range Road 232	Main Road
Private Road	Minor Road
Sherwood Park	City/Town

Date: August 14, 2003

Other: I.e. source of intersection information

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	0.7	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	3	1	3	Number of legs = 3 or more	OK	3
				Geometric Factors Subtotal		**48**

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	7900	4	10	Either Use the two AADT inputs OR the Descriptive Signalization	OK	40
AADT on Minor Road (2-way)	180	0	20	Warrant (Unused values should be set to Zero) Refer to Table	OK	0
Signalization Warrant	Descriptive	0	30	1(B) for description and rating values for signalization warrant.	OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
				Operational Factors Subtotal		**60**

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
				Environmental Factor Subtotal		**0**

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)		0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of **all** night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
				Collision History Subtotal		**0**

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY

Geometric Factors Subtotal	48
Operational Factor Subtotal	60
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	108

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

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Please enter information in the cells with yellow background

INTERSECTION CHARACTERISTICS

Range Road 232	Main Road
Estate Dr.	Minor Road
Sherwood Park	City/Town

Date	August 14, 2003
Other	i.e. source of intersection information

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	2.5	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	4	2	3	Number of legs = 3 or more	OK	6
					Geometric Factors Subtotal	51

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	7900	4	10	Either Use the two AADT inputs OR the Descriptive Signalization	OK	40
AADT on Minor Road (2-way)	1130	2	20	Warrant (Unused values should be set to Zero) Refer to Table	OK	40
Signalization Warrant	Descriptive	0	30	1(B) for description and rating values for signalization warrant.	OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
					Operational Factors Subtotal	100

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
					Environmental Factor Subtotal	0

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter either the annual frequency (See Table 1(C), note #4)	OK	0
OR				OR the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)		0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of all night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
					Collision History Subtotal	0

Check Intersection Signalization:
Intersection is not Signalized

ILLUMINATION WARRANTED
REVIEW SITE AND COLLISIONS TO DETERMINE LIGHTING TYPE
(PARTIAL OR DELINEATION)

SUMMARY	
Geometric Factors Subtotal	51
Operational Factor Subtotal	100
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	151

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

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Please enter information in the cells with yellow background

INTERSECTION CHARACTERISTICS

Range Road 232	Main Road
Central Dr.	Minor Road
Sherwood Park	City/Town

Date	August 14, 2003
Other	I.e. source of intersection information

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	0.1	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	3	1	3	Number of legs = 3 or more	OK	3
					Geometric Factors Subtotal	**48**

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	7900	4	10	Either Use the two AADT inputs **OR** the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	40
AADT on Minor Road (2-way)	200	0	20		OK	0
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
					Operational Factors Subtotal	**60**

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
					Environmental Factor Subtotal	**0**

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)		0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of **all** night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
					Collision History Subtotal	**0**

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY

Geometric Factors Subtotal	48
Operational Factor Subtotal	60
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	108

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

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Please enter information in the cells with yellow background

INTERSECTION CHARACTERISTICS

Range Road 232	Main Road	Date	August 14, 2003
Yorkley Dr.	Minor Road	Other	i.e. source of intersection information
Sherwood Park	City/Town		

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	0.1	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	3	1	3	Number of legs = 3 or more	OK	3
				Geometric Factors Subtotal		48

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	4100	3	10	Either Use the two AADT inputs **OR** the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	30
AADT on Minor Road (2-way)	210	0	20		OK	0
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
				Operational Factors Subtotal		50

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
				Environmental Factor Subtotal		0

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)		0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of all night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
				Collision History Subtotal		0

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY

Geometric Factors Subtotal	48
Operational Factor Subtotal	50
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	98

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

This spreadsheet is to be used in conjunction with *Illumination of Isolated Rural Intersections* , Transportation Association of Canada, February 2001.

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INTERSECTION CHARACTERISTICS

Range Road 232	Main Road
Scott Cr. /Edward Cr.	Minor Road
Sherwood Park	City/Town

Date: August 14, 2003

Other: i.e. source of intersection information

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	1.6	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	4	2	3	Number of legs = 3 or more	OK	6
				Geometric Factors Subtotal		51

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	3700	3	10	Either Use the two AADT inputs OR the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	30
AADT on Minor Road (2-way)	225	0	20		OK	0
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
				Operational Factors Subtotal		50

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
				Environmental Factor Subtotal		0

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)		0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of all night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
				Collision History Subtotal		0

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY	
Geometric Factors Subtotal	51
Operational Factor Subtotal	50
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	101

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

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INTERSECTION CHARACTERISTICS

Range Road 232	Main Road
WinfieldSouth	Minor Road
Sherwood Park	City/Town

Date	August 14, 2003
Other	i.e. source of intersection information

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	3.7	1	3	Rounded to nearest tenth of a percent	OK	3
Number of Intersection Legs	3	1	3	Number of legs = 3 or more	OK	3
				Geometric Factors Subtotal		**51**

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	3700	3	10	Either Use the two AADT inputs **OR** the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	30
AADT on Minor Road (2-way)	130	0	20		OK	0
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
				Operational Factors Subtotal		**50**

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
				Environmental Factor Subtotal		**0**

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)		0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of all night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
				Collision History Subtotal		**0**

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY

Geometric Factors Subtotal	51
Operational Factor Subtotal	50
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	101

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

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INTERSECTION CHARACTERISTICS

Range Road 232	Main Road
Cranberry Cr.	Minor Road
Sherwood Park	City/Town

Date: August 14, 2003

Other: I.e. source of intersection information

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	0.7	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	4	2	3	Number of legs = 3 or more	OK	6
				Geometric Factors Subtotal		51

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	3700	3	10	Either Use the two AADT inputs **OR** the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	30
AADT on Minor Road (2-way)	130	0	20		OK	0
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
				Operational Factors Subtotal		50

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
				Environmental Factor Subtotal		0

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)		0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of all night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
				Collision History Subtotal		0

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY	
Geometric Factors Subtotal	51
Operational Factor Subtotal	50
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	101

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

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INTERSECTION CHARACTERISTICS

Range Road 232	Main Road
Winfield_Edelweiss	Minor Road
Sherwood Park	City/Town

Date	August 14, 2003
Other	i.e. source of intersection information

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	0.7	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	4	2	3	Number of legs = 3 or more	OK	6
				Geometric Factors Subtotal		**51**

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	3700	3	10	Either Use the two AADT inputs OR the Descriptive Signalization	OK	30
AADT on Minor Road (2-way)	130	0	20	Warrant (Unused values should be set to Zero) Refer to Table	OK	0
Signalization Warrant	Descriptive	0	30	1(B) for description and rating values for signalization warrant.	OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
				Operational Factors Subtotal		**50**

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
				Environmental Factor Subtotal		**0**

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)		0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of all night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
				Collision History Subtotal		**0**

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY

Geometric Factors Subtotal	51
Operational Factor Subtotal	50
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	101

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

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INTERSECTION CHARACTERISTICS

Range Road 233	Main Road
Wallmart	Minor Road
Sherwood Park	City/Town

Date	August 14, 2003
Other	i.e. source of intersection information

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	0.8	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	4	2	3	Number of legs = 3 or more	OK	6
				Geometric Factors Subtotal		51

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	18900	4	10	Either Use the two AADT inputs OR the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	40
AADT on Minor Road (2-way)	1890	3	20		OK	60
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	10	2	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	20
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
				Operational Factors Subtotal		140

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
				Environmental Factor Subtotal		0

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of **all** night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
				Collision History Subtotal		0

Check Intersection Signalization:
Intersection is not Signalized

ILLUMINATION WARRANTED
DELINEATION LIGHTING TO ILLUMINATE PEDESTRIANS OR CROSS STREET TRAFFIC

SUMMARY

Geometric Factors Subtotal	51
Operational Factor Subtotal	140
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	191

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

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INTERSECTION CHARACTERISTICS

Range Road 233	Main Road	Date	August 14, 2003
Wallace Dr.	Minor Road	Other	i.e. source of intersection information
Sherwood Park	City/Town		

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	0.8	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	4	2	3	Number of legs = 3 or more	OK	6
				Geometric Factors Subtotal		**51**

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	18900	4	10	Either Use the two AADT inputs OR the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	40
AADT on Minor Road (2-way)	160	0	20		OK	0
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
				Operational Factors Subtotal		**60**

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
				Environmental Factor Subtotal		**0**

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of all night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
				Collision History Subtotal		**0**

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY

Geometric Factors Subtotal	51
Operational Factor Subtotal	60
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	111

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

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INTERSECTION CHARACTERISTICS

Range Road 233	Main Road
South Avenue	Minor Road
Sherwood Park	City/Town

Date: August 14, 2003

Other: i.e. source of intersection information

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	1.7	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	3	1	3	Number of legs = 3 or more	OK	3
					Geometric Factors Subtotal	**48**

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	18900	4	10	Either Use the two AADT inputs **OR** the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	40
AADT on Minor Road (2-way)	180	0	20		OK	0
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
					Operational Factors Subtotal	**60**

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
					Environmental Factor Subtotal	**0**

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of all night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
					Collision History Subtotal	**0**

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY

Geometric Factors Subtotal	48
Operational Factor Subtotal	60
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	108

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LIGHTING WARRANT SPREADSHEET

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Please enter information in the cells with yellow background

INTERSECTION CHARACTERISTICS

Range Road 233	Main Road
Fountain Creek Road	Minor Road
Sherwood Park	City/Town

Date: August 14, 2003

Other: i.e. source of intersection information

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	1.1	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	4	2	3	Number of legs = 3 or more	OK	6
				Geometric Factors Subtotal		**51**

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	5300	4	10	Either Use the two AADT inputs OR the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	40
AADT on Minor Road (2-way)	1000	2	20		OK	40
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
				Operational Factors Subtotal		**100**

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
				Environmental Factor Subtotal		**0**

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of all night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
				Collision History Subtotal		**0**

Check Intersection Signalization:
Intersection is not Signalized

ILLUMINATION WARRANTED
REVIEW SITE AND COLLISIONS TO DETERMINE LIGHTING TYPE
(PARTIAL OR DELINEATION)

SUMMARY	
Geometric Factors Subtotal	51
Operational Factor Subtotal	100
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	151

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

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Please enter information in the cells with yellow background

INTERSECTION CHARACTERISTICS

Range Road 233	Main Road	Date	August 14, 2003
Fountain Creek Way	Minor Road	Other	i.e. source of intersection information
Sherwood Park	City/Town		

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	1.1	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	4	2	3	Number of legs = 3 or more	OK	6
				Geometric Factors Subtotal		51

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	5300	4	10	Either Use the two AADT inputs OR the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	40
AADT on Minor Road (2-way)	1000	2	20		OK	40
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
				Operational Factors Subtotal		100

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
				Environmental Factor Subtotal		0

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of all night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
				Collision History Subtotal		0

Check Intersection Signalization:
Intersection is not Signalized

ILLUMINATION WARRANTED
REVIEW SITE AND COLLISIONS TO DETERMINE LIGHTING TYPE (PARTIAL OR DELINEATION)

SUMMARY

Geometric Factors Subtotal	51
Operational Factor Subtotal	100
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	151

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

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Please enter information in the cells with yellow background

INTERSECTION CHARACTERISTICS

Range Road 233	Main Road
Fountain Creek Blvd	Minor Road
Sherwood Park	City/Town

Date August 14, 2003

Other i.e. source of intersection information

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	0.2	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	4	2	3	Number of legs = 3 or more	OK	6
				Geometric Factors Subtotal		**51**

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	5300	4	10	Either Use the two AADT inputs **OR** the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	40
AADT on Minor Road (2-way)	790	1	20		OK	20
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
				Operational Factors Subtotal		**80**

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
				Environmental Factor Subtotal		**0**

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4) **OR** the number of collisions / MEV (Unused values should be set to Zero)	OK	0
OR						
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0		OK	0
Is the average ratio of all night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
				Collision History Subtotal		**0**

Check Intersection Signalization:
Intersection is not Signalized

ILLUMINATION WARRANTED
REVIEW SITE AND COLLISIONS TO DETERMINE LIGHTING TYPE (PARTIAL OR DELINEATION)

SUMMARY	
Geometric Factors Subtotal	51
Operational Factor Subtotal	80
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	131

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Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

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INTERSECTION CHARACTERISTICS

Range Road 233	Main Road	Date	August 14, 2003
Chrenek Dr.	Minor Road	Other	I.e. source of intersection information
Sherwood Park	City/Town		

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	3		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	y				OK	
Highest operating speed on raised, channelized approach (km/h)	60		15		OK	
Channelization Factor					OK	45
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	0.2	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	3	1	3	Number of legs = 3 or more	OK	3
				Geometric Factors Subtotal		48

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	4800	3	10	Either Use the two AADT inputs OR the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	30
AADT on Minor Road (2-way)	165	0	20		OK	0
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	30	0	5	Refer to Table 1(B), note #3	OK	0
				Operational Factors Subtotal		50

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
				Environmental Factor Subtotal		0

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter either the annual frequency (See Table 1(C), note #4)	OK	0
OR				OR the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of all night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
				Collision History Subtotal		0

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY

Geometric Factors Subtotal	48
Operational Factor Subtotal	50
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	98

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APPENDIX G

ENVIRONMENTAL AND HISTORICAL OVERVIEW

AN ENVIRONMENTAL OVERVIEW FOR THE FUNCTIONAL PLANNING STUDY FOR RANGE ROADS 231, 232, 233

Earth Tech
Strathcona County

DRAFT REPORT

Westworth Associates Environmental Ltd.

Edmonton, Alberta

March 2003

EXECUTIVE SUMMARY

Strathcona County is experiencing significant growth, particularly in the Urban Service Area. Four areas within Strathcona County where a new urban service area may be supported in the future have been identified in the Municipal Development Plan. Two of these areas are located south of Sherwood Park, and could have impacts on Range Roads 231, 232, and 233. To address transportation related issues associated with future higher development densities and the potential for a second area of urban development, Strathcona County retained Earth Tech Canada Ltd. to undertake functional planning studies for these roadways. For each road a number of alternative designs, including urban versus rural and 4-lane undivided versus or 4-lane divided, are being reviewed and recommendations for a road cross-section will be made. As part of these functional planning studies, Westworth Associates Environmental Ltd. was retained to provide an environmental and historical resources overview, including identification of potential issues and concerns and feasible mitigation measures for environmental impacts associated with the potential road upgrading projects.

Dark Gray Luvisolic soil developed on clay loam textured till (Uncas) is the most common soil series along Range Roads 232 and 233. Orthic Gray Luvisolic (Cooking Lake) soil, also occurring on clay loam textured till, is also common along the southern portion of Range Raod 231. Low-lying areas contain various Gleysolic and shallow Organic soils that are usually wet. Topsoil is generally rated as Fair suitability for re-vegetation because of pH with thickness varying between 10 and 25 cm. Surface horizons (Ah and Ap) are dark gray to black in color and often overly a grayish Ae horizon. Subsoil is also rated a s Fair suitability for re-vegetation because of texture and consistence. The soils are non-saline and non-sodic.

Much of the area has been altered by agricultural and residential developments. Natural vegetation along the roadways consists primarily of aspen/balsam forest, although aspen forest, willow shrubland, cattail marsh, sedge/grass meadow, and wetland complexes are also present. There is some potential for the occurrence of rare plant species in habitats adjacent to the roadways, particularly associated with wetland areas. However, rare plants have not been recorded during several road upgrading projects within Strathcona County in recent years.

Several mammals, including deer, moose, coyote, fox, striped skunk, least weasel, short-tailed weasel, badger, mink, pocket gopher, Richardson's ground squirrel, red squirrel, snowshoe hare, mice, voles, shrews, and bats, are known to occur in the general region.

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Figure 4. Annual average daily traffic count along Range Roads 231-233 between Wye Road and Highway 628 for 1996-2001..... 43

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Figure 6. Sensitive historical locations along Range Roads 231-233 between Wye Road and Highway 628. 48

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1.0 INTRODUCTION

1.1. PROJECT BACKGROUND

Strathcona County is experiencing significant growth, particularly in the Urban Service Area. Four areas within Strathcona County where a new urban service area may be supported in the future have been identified in the Municipal Development Plan. Two of these areas are located south of Sherwood Park, and could have impacts on Range Roads 231, 232, and 233. Range Roads 231, 232, and 233 have been re-constructed to what was considered to be a County Class 1 standard at that time. Range Roads 231 and 233 have a 9-metre asphalt surface width and Range Road 232 has an 8-0metre asphalt surface width. Right-of-way widths vary from 20.11 to 35 metres.

To address transportation related issues associated with future higher development densities and the potential for a second area of urban development, Strathcona County retained Earth Tech Canada Ltd. to undertake a functional planning study for these roads. For each road, a number of alternative designs, including urban versus rural and 4-lane undivided versus or 4-lane divided, are being reviewed and recommendations for a road cross-section will be made. As part of these functional planning studies, Westworth Associates Environmental Ltd. was retained to provide an environmental and historical resources overview, including identification of potential issues and concerns and feasible mitigation measures for environmental impacts associated with the potential road upgrading projects.

1.2. Objectives

The main objective was to provide an environmental and historical resources overview for the Range Roads 231-233 functional planning study. Specific objectives were to:

- Provide information on soils, vegetation (including rare plants), wildlife and fish populations, and wildlife and fish habitat along the existing rights-of-way and areas that could be affected by the potential road upgrading project;
- Identify potential environmental concerns associated with the potential road upgrading project, including impacts on soils, rare or threatened vegetation and/or wildlife species, loss of wildlife and fish habitat; and vehicle/wildlife collisions.

ACKNOWLEDGEMENTS

The contributions and cooperation of various individuals and agencies during the course of the environmental evaluation are gratefully acknowledged. Thanks are extended to Mr. H. Shaheen of Earth Tech Ltd. for providing background engineering information on the proposed project, as well as project mosaics. Mr. R. Yanitski (Strathcona County) provided data on animal/vehicle collisions information for Range Roads 231, 232, and 233. John Folinsbee, and Lisa Takats of Alberta Sustainable Resource Development, John Rintoul of Community Development Services, and Michael Semenchuk of the Federation of Alberta Naturalists assisted in compiling information on natural resources of the region.

Study Team

Study Component	*Study Team Member*
Westworth Associates Environmental Ltd.	
Project Management	
Natural Resource Overview and Assessment	Marie Nietfeld
Habitat Mapping	Greg Sather
Pedocan Land Evaluation	
Soils/Terrain	Brian Chernipeski
Western Heritage Resources Ltd.	
Historical Resources	Terrance Gibson

EXECUTIVE SUMMARY

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1.1. PROJECT BACKGROUND

Strathcona County is experiencing significant growth, particularly in the Urban Service Area. Four areas within Strathcona County where a new urban service area may be supported in the future have been identified in the Municipal Development Plan. Two of these areas are located south of Sherwood Park, and could have impacts on Range Roads 231, 232, and 233. Range Roads 231, 232, and 233 have been re-constructed to what was considered to be a County Class 1 standard at that time. Range Roads 231 and 233 have a 9-metre asphalt surface width and Range Road 232 has an 8-0metre asphalt surface width. Right-of-way widths vary from 20.11 to 35 metres.

To address transportation related issues associated with future higher development densities and the potential for a second area of urban development, Strathcona County retained Earth Tech Canada Ltd. to undertake a functional planning study for these roads. For each road, a number of alternative designs, including urban versus rural and 4-lane undivided versus or 4-lane divided, are being reviewed and recommendations for a road cross-section will be made. As part of these functional planning studies, Westworth Associates Environmental Ltd. was retained to provide an environmental and historical resources overview, including identification of potential issues and concerns and feasible mitigation measures for environmental impacts associated with the potential road upgrading projects.

1.2. Objectives

The main objective was to provide an environmental and historical resources overview for the Range Roads 231-233 functional planning study. Specific objectives were to:

- Provide information on soils, vegetation (including rare plants), wildlife and fish populations, and wildlife and fish habitat along the existing rights-of-way and areas that could be affected by the potential road upgrading project;
- Identify potential environmental concerns associated with the potential road upgrading project, including impacts on soils, rare or threatened vegetation and/or wildlife species, loss of wildlife and fish habitat; and vehicle/wildlife collisions.

2

2.0 STUDY AREA

The study area is located immediately south of Sherwood Park, between Wye Road and Highway 628, encompassing Range Roads 231, 232, and 233. For the purposes of the environmental overview, the study area included an area of 500 m on either side of the current Range Road alignments (Figure 1). The historical resources overview examined historical resources between Range Roads 230 to 234.

Physiographically, the study area lies mainly within the Edmonton Lake Plain, with the eastern end occurring within the Cooking Lake Upland (Pettapiece 1986). The study area is generally characterized by low relief, although some hummocky, 'knob and kettle' topography typical of disintegration moraines is also evident (Westworth and Knapik 1987). Glacial till and glaciolacustrine materials are the dominant surficial deposits. The soils are predominantly Eluviated Black Chernozems which have a high capability for agriculture. Some Orthic Gray Luvisols, Gleysols, and Organic soils are also present (Westworth and Knapik 1987).

Ecologically, the project area occupies 2 natural subregions, the Boreal Dry Mixedwood Natural Subregion and the Central Parkland Subregion. The Boreal Dry Mixedwood Natural Subregion represents a transitional area between the Central Parkland and Central Mixedwood subregions (Achuff 1994). The northern portion of the Central Parkland Subregion, which encompasses the study area, is characterized by aspen parkland and closed aspen forests (Achuff 1994). Trembling aspen and balsam poplar are the dominant tree species in the area, although paper birch is also present in many stands. White spruce is the climax species for the Boreal Dry Mixedwood Subregion, however, frequent fires and disturbance in the past has maintained much of the forest areas in earlier stages of succession. Common shrub species associated with aspen forest include low-bush cranberry, red-osier dogwood, prickly rose, and beaked hazelnut. White spruce, paper birch, balsam poplar and trembling aspen are characteristic species of mixedwood forests.

The area experiences short, warm summers and long, cold winters characteristic of a cool summer humid continental climate. Average monthly temperature ranges from –12.5° C in January to 17.5° C in July, with the average annual temperature being 3.6° C (Environment Canada 1993). The average annual precipitation is 46 cm, of which 35 cm falls as rain. The

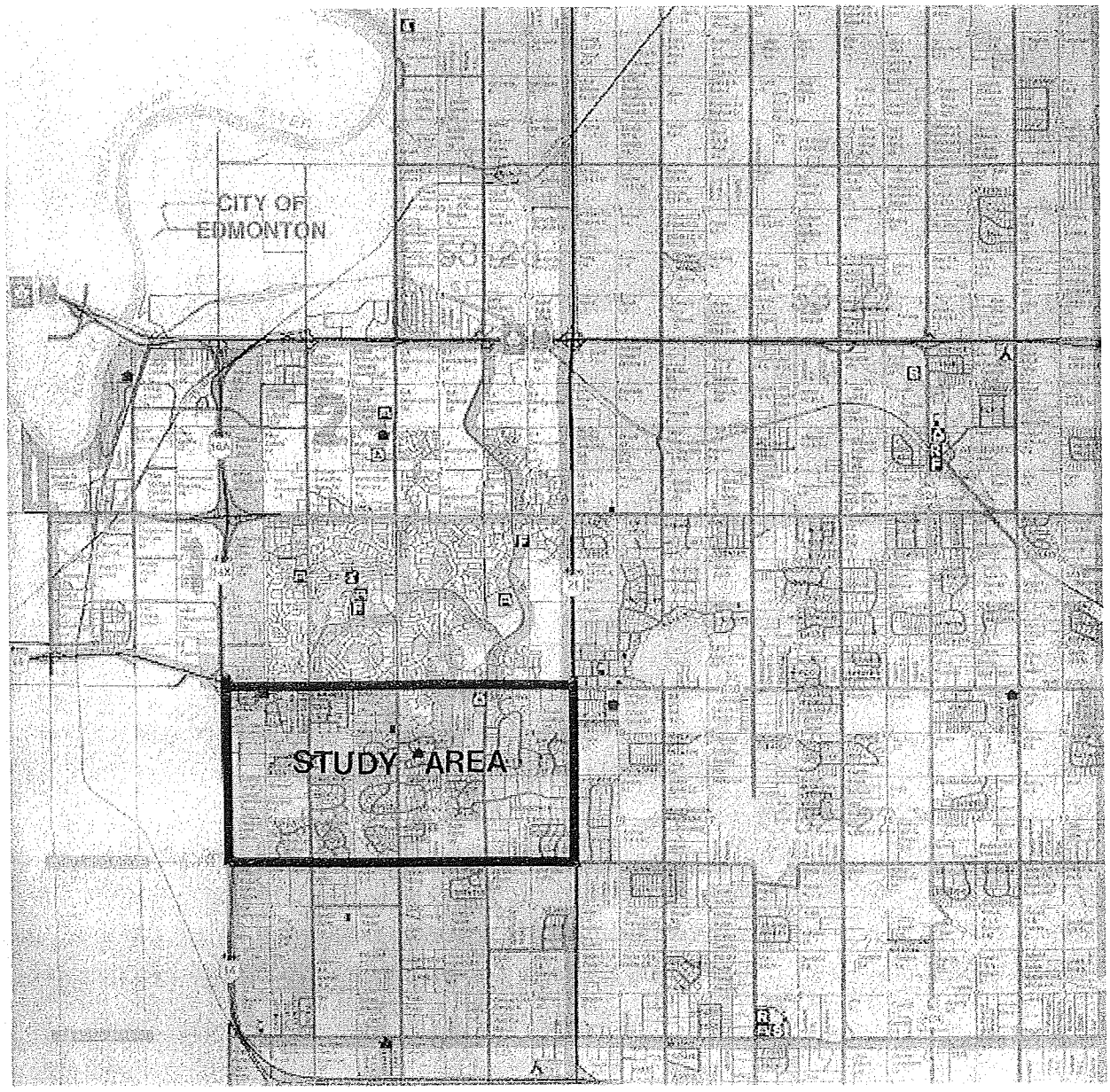


Figure 1. Location of Range Roads 231-233 functional planning study area within Strathcona County.

communities in the area were noted, and all observations of wildlife or their sign (e.g., ungulate/hare browse, animal tracks, scats) were recorded during the survey. The road alignments were also examined for the presence of watercourses and drainages that may function as fish habitat.

3.2.4. Species of Concern

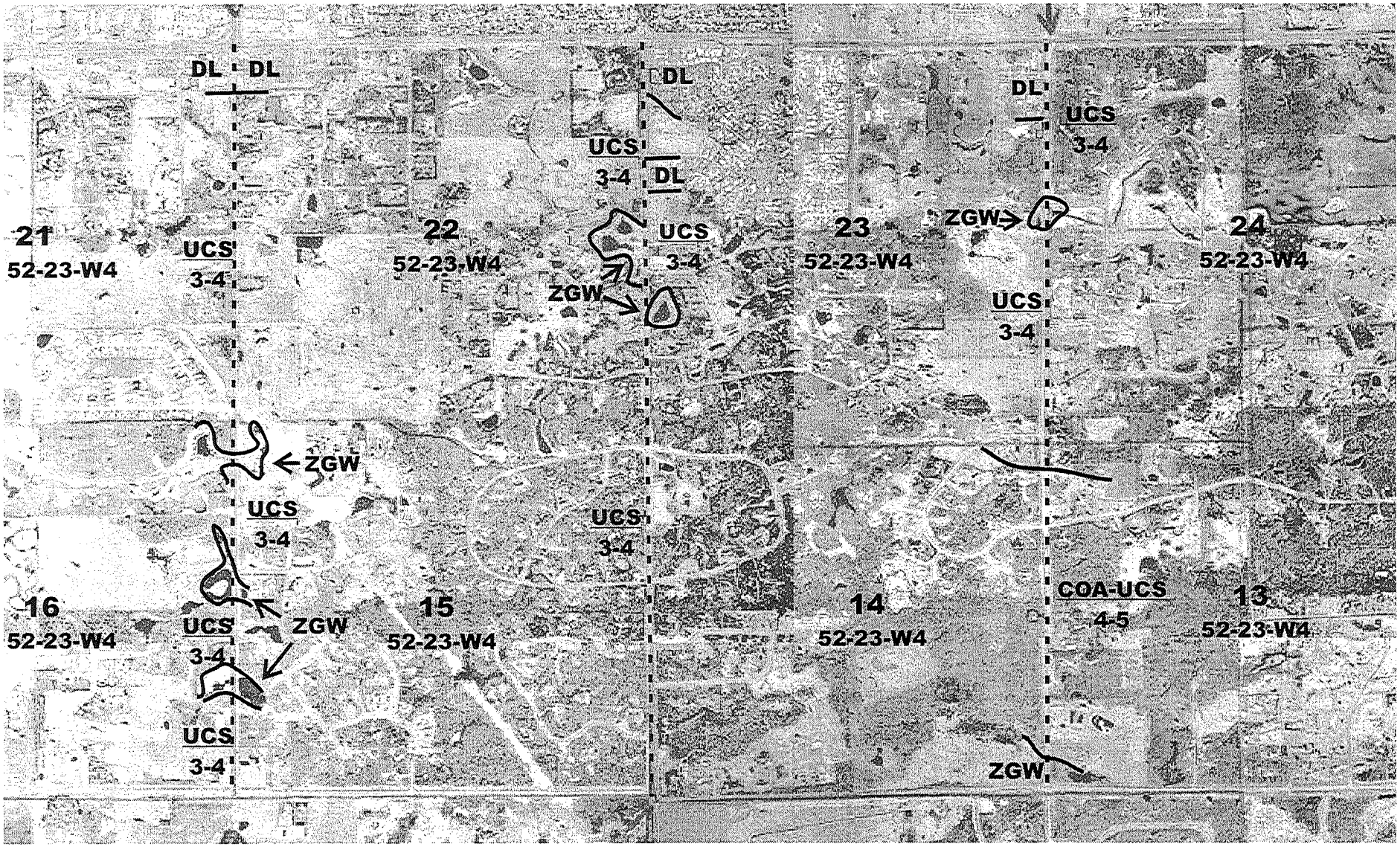
Wildlife species of special concern known to occur or which may potentially occur in the vicinity of the proposed road upgrading projects were identified from Breeding Bird Atlas surveys, Christmas Bird Counts, communications with regional wildlife biologists, previous studies in the area, as well as from range maps and habitat preference information. Species of special concern included those provincially listed as 'At Risk', 'May Be At Risk', and 'Sensitive' by Alberta Environment, Wildlife Management Division (AENV 2000d), as well as those listed nationally by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2002).

3.3. Historical Resources

Site inventories and permit reports from the Archaeological Survey, Provincial Museum of Alberta, and Historic Sites and Archives Service were consulted to identify previous studies and historical resources in the study area. The Palaeontological Resources Sensitivity Map prepared by the Tyrrell Museum of Palaeontology (1984) was also examined to determine the sensitivity of the area for palaeontological sites.

3.4. Environmental Effects Assessment and Mitigation Opportunities

The environmental assessment for the Range Road 231-233 functional planning study also involved the analysis of potential impacts and identification of suitable mitigation measures. Potential impacts associated with road upgrading were assessed with respect to direction, magnitude, duration, geographical extent, and overall significance using assessment methodologies outlined by Beanlands and Duinker (1983). Mitigation measures and guidelines for minimizing environmental impacts on adjacent lands and wetlands, and the associated wildlife and aquatic resources, were also identified. Residual impacts, those impacts that remain after implementation, were also identified and assessed.



Map Label:
UCS - Soil Series Code
3 - Topography Class

Soil Series:
COA - Cooking Lake
RLV - Rolly View
UCS - Uncas

Miscellaneous:
DL - Disturbed land
ZGW - Wet soils

Topography Class:
3 - Very gentle slopes (2-5%)
4 - Gentle slopes (6-9%)
5 - Moderate slopes (10-15%)

Approximate Scale = 1:20,(

Figure 2. Distribution of soils along Range Roads 231, 232 and 233, between Wye Road and Highway 628.

4.2. Soil Evaluation

4.2.1. Soil Quality

Soil suitability for reclamation is rated using criteria proposed by the Soil Quality Criteria Subcommittee of the Alberta Soils Advisory Committee (1987). These guidelines provide a subjective evaluation of suitability (e.g., good, fair, poor, unsuitable) according to physical and chemical properties of the soils. The ratings are based on general predictions of soil performance and do not consider varying requirements of individual plant species or special management input.

Topsoil is generally rated as Fair suitability for re-vegetation because of pH with thickness varying between 10 and 25 cm. Surface horizons (Ah and Ap) are dark gray to black in color and often overly a grayish Ae horizon. Subsoil is also rated as Fair suitability for re-vegetation because of texture and consistence. The soils are non-saline and non-sodic. Suitability ratings of soils for reclamation are summarized in Table 2.

Table 2. Topsoil thickness and soil quality ratings.

Soil Symbol	Soil Name	Topsoil Thickness (cm)	Soil Quality Rating		Topsoil Identification	Salinity Concerns
			Topsoil	Subsoil		
COA	Cooking Lake	10-20	Fair	Fair	Not obvious	No
UCS	Uncas	15-25	Fair	Fair	Obvious	No

In general, topsoil has more desirable properties and is a better growth medium than the underlying subsoil. Topsoil is defined as all Ap, Ah, Ahe and AB horizons; plus a portion or all of the Ae horizon. The total thickness of topsoil should be salvaged. Identifying the dark topsoil from the lighter colored subsoil should be relatively easy during salvage.

4.2.2. Soil Erosion

The risk of soil erosion by water ranges from Low to High when the vegetation is disturbed according to slope steepness (Pedocan 1993). Steep (>9%) slopes, expected to be short in length because hummocky terrain, will have a High risk of erosion by water following construction until a vegetation cover is established. Short-term protection measures should be implemented immediately following construction on short, steep slopes that are identified in the field. No off-site erosion is anticipated because slope-length is limited on undulating and hummocky terrain.

leaved coltsfoot, horsetail, cow parsnip, common nettle, marsh willowherb, and wild mint, are often characteristic of wet depression areas, as are sedges. Grazed stands are characterized by a less well-developed shrub understory and lower ground cover diversity.

Aspen Forest

Aspen forest is characterized by a canopy dominated by aspen, and is associated with drier upland sites. The tall shrub layer may be less developed or lacking within the aspen stands. The short shrub layer is generally moderately- to well-developed with representative species being rose, snowberry, raspberry, low-bush cranberry, red-osier dogwood, and bracted honeysuckle. Ground layer species are similar to those for aspen/balsam poplar stands, although the proportions may differ.

Mixedwood Forest

Aspen, balsam poplar, and white spruce are the common canopy species in mixedwood stands (Photo 2), although scattered birch may also be present. Common understory shrubs in mixedwood forests include red-osier dogwood, Canada buffaloberry, low-bush cranberry, prickly rose, wild red currant, northern wild gooseberry, willow, beaked hazelnut, wild raspberry, and Labrador tea. The ground layer species may include white-grained rice grass, fowl bluegrass, wild strawberry, horsetail, palmate-leaved coltsfoot, hemp-nettle, wild lily-of-the-valley, bunchberry, common dandelion, twinflower, Lindley's aster, kidney-leaved violet, and wild vetch.

Willow Shrubland

Willow is typically associated with wet depressional areas in forests, sedge meadows, and around wetland edges. Willows may occur in relatively continuous cover or as scattered clumps (Photo 3). In forested habitat and wetland edges, common understory species include red-osier dogwood, bracted honeysuckle, wild raspberry, wild red currant, and northern wild gooseberry. Ground layer species may include bluejoint, fowl bluegrass, northern reedgrass, sedges, horsetail, cow parsnip, common nettle, arrow-leaved coltsfoot, rough cinquefoil, bedstraw, marsh marigold, and common dandelion. In open areas, sedges and other graminoids such as fowl bluegrass, slough grass, and bluejoint generally dominate the understory.

Sedge/Grass Meadows

Sedge/grass meadows are associated with some hygric/sub-hygric depressional areas within the study area (Photo 4). Sedges typically dominate this community, although other species such as fowl bluegrass, bluejoint, manna grass, northern reedgrass, reed canary



Photo 1. Aspen/balsam poplar forest within the Range Road 231-233 study area, 24 November 2002.



Photo 2. Mixedwood habitat along Range Road 233, 24 November 2002.

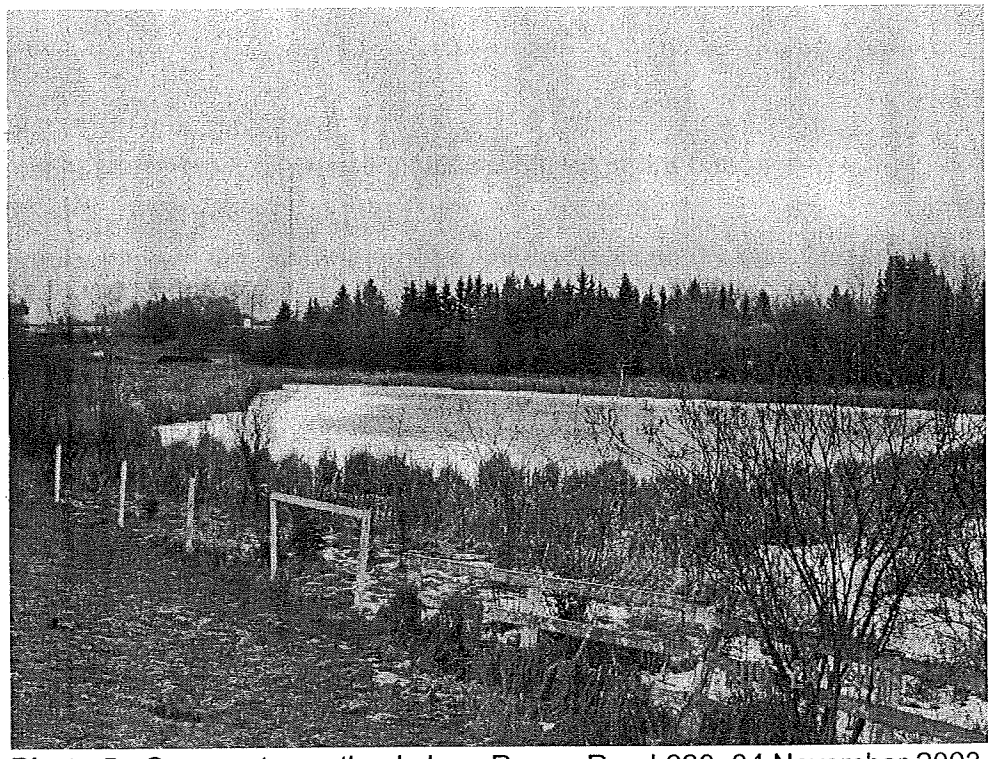


Photo 5. Open water wetland along Range Road 233, 24 November 2002.



Photo 6. Open water wetland along Range Road 233, 24 November 2002.

abundant in the vicinity of Highway 629 to the southeast of the study area, and coyotes are frequently recorded during ungulate aerial surveys in Strathcona County (J. Folinsbee, Sustainable Resource Development, personal communication). A local resident indicated that red foxes also occur in the vicinity of Highway 628. Other carnivores which may occupy habitats within the study area include striped skunk, least weasel, short-tailed weasel, badger, and mink (Skinner 2000).

Semi-aquatic Furbearers

Beaver and muskrat are common in the region. Beaver occur where adequate forage species, such as aspen, balsam poplar, willow, and birch, occur close to the water's edge, and where water levels are stable and sufficiently deep to allow utilization of winter food caches (Searing 1979). Muskrat require wetlands or slow moving water deep enough not to freeze and with sufficient aquatic and semi-aquatic plants to provide food and building materials for houses. Some of the wetlands within the study area likely provide suitable habitat for beaver and muskrats.

Small Mammals

Snowshoe hare are relatively common in forested habitat in Strathcona County (Skinner 2000). The red squirrel is typically present wherever mixedwood or coniferous habitat is available (Skinner 2000, Nietfeld and Brusnyk 2002, 2003). Richardson's ground squirrels and pocket gophers inhabit pastures and haylands, and forest edges, and right-of-ways within Strathcona County. Both of these species are generally abundant in forage-based agricultural lands.

Several other species of mammals expected to occur in the study area include the deer mouse, red-backed vole, meadow vole, shrews, and brown bats. Deer mice exhibit broad habitat preferences (Nietfeld et al. 2001, Kipen Gibbs 1993) and may be found in treed, shrub, and grassland habitats, as well as wetland edges. Red-backed voles generally inhabit damp and coniferous forests, bogs, and occasionally drier aspen forests, while meadow voles prefer meadows and grasslands habitats (Pattie and Fisher 1999). A number of shrew species occur in the region (e.g., masked shrew, Arctic shrew, prairie shrew), occupying a variety of habitat types. The little brown and big brown bats are likely to be found where suitable roosting sites (loose bark on trees, buildings) and foraging habitat (water bodies) are available.

4.4.2. Avifauna

Over 80 species of birds are expected to occur in the study area based on the Alberta Breeding Bird Atlas, other surveys in the general area (e.g., Nietfeld and Westworth 1997,

may use wetlands, dugouts, and wet depressional areas in forests and grasslands in the study area for breeding. Tiger salamanders prefer moist, dark sheltered areas near water. Tiger salamanders may occur in moist lowland balsam poplar areas and use natural wetlands or dugouts in the study area for breeding.

Two reptiles, the red-sided and plains garter snakes, may occur in the study area. However, both species (particularly the plains) are uncommon. Garter snakes live in the vicinity of ponds, lakes, marshes, dugouts, and streams (Russell and Bauer 1993). They are more likely to be found in the vicinity of suitable hiberacula (fractured bedrock, gravel deposits) (W. Roberts, University of Alberta, personal communication).

4.4.4. Species of Concern

Based on provincial and federal risk categories (Table 3 and 4), 20 species of concern may potentially occur in the Range Roads 231-233 study area (Table 5). All of these species are listed provincially, whereas only one is listed federally. General habitat preferences of these species are summarized in Table 5. Although some habitat is available for these species in natural areas in the study area, the potential for most of these species to inhabit and/or rely on habitats adjacent to Range Roads 233, 232, and 231 is considered to be very low.

Table 3. Risk categories for wildlife species of concern in Alberta (AENV 2000d).

At Risk	Any species known to be "At Risk" of extinction after formal detailed assessment and designated as "Endangered" or "Threatened" in Alberta.
May Be At Risk	Any species which "May Be At Risk" of extinction or extirpation, and is therefore a candidate for detailed risk assessment.
Sensitive	Any species that is not at risk of extinction or extirpation but may require special attention or protection to prevent it from becoming at risk.

Table 4. Relevant federal risk status of wildlife species in Canada (COSEWIC 2002).

Endangered	A species facing immediate extinction or extirpation.
Threatened	A species likely to become endangered if limiting factors are not reversed.
Special Concern	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
Not at Risk	A species that has been evaluated and found to be not at risk.

Four of these species are listed as 'May Be At Risk' in Alberta (AENV 2000d), and include the short-eared owl, northern long-eared bat, long-tailed weasel, and Canadian toad (Table 5). The short-eared owl is an open country species that prefers to breed in grasslands, grassy or brushy meadows, marshland, pastures, fields, and cleared forested areas, often nesting in the vicinity of water (Semechuk 1992). This species is also listed as 'Special

Table 5. Species of concern which could potentially occur in habitats in the vicinity of Range Roads 231-233 between Wye Road and Highway 628.

Common Name	Scientific Name	Provincial Status	Federal Status[1]	General Habitat Preferences[2]
Amphibians and Reptiles				
Canadian toad	Bufo hemiophrys	May Be At Risk	Not listed	Breed in the shallows of lakes, ponds, marshes, ditches and other temporary bodies of water.
plains garter snake	*Thamnophis radix*	Sensitive	Not listed	Near ponds, lakes, dugouts, streams.
red-sided garter snake	*Thamnophis sirtalis*	Sensitive	Not listed	Broad habitat preferences include forest, farm, or near water.
Avifauna				
short-eared owl	*Asio flammeus*	May Be At Risk	Special Concern	Open country including grasslands, wet meadows and cleared forests.
northern goshawk	*Accipiter gentilis*	Sensitive	Not at Risk	Breeding: mature coniferous, deciduous and mixed woods; nonbreeding: forest edges, parks and farmland.
Swainson's hawk	*Buteo swainsoni*	Sensitive	Not listed	Open fields, grasslands and agricultural areas.
horned grebe	*Podiceps auritus*	Sensitive	Not listed	breeding: shallow, weedy wetlands; migration: wetlands and larger lakes
pied-billed grebe	*Podilymbus podiceps*	Sensitive	Not listed	ponds, marshes and backwaters with thick emergent vegetation
great blue heron	*Ardea herodias*	Sensitive	Not listed	Forages along the edges of rivers, lakes and marshes; also observed in wet meadows and fields.
American bittern	*Botaurus lentiginosus*	Sensitive	Not listed	breeds in marshes, swamps, moist meadows, alder or willow thickets
black tern	*Chlidonias niger*	Sensitive	Not listed	Shallow lakes, marshes, ponds and wet meadows
sedge wren	*Cistothorus platensis*	Sensitive	Not listed	Sedge meadows and grassy fields.
purple martin	*Progne subis*	Sensitive	Not listed	Nests in semi-open forests often near water, or communal bird houses.
common nighthawk	*Chordeiles minor*	Sensitive	Not listed	Open forest, meadows, and grasslands.
pileated woodpecker	*Dryocopus pileatus*	Sensitive	Not listed	Mature coniferous, mixed wood or deciduous forests; prefers areas with dead and dying trees.
western tanager	*Piranga ludoviciana*	Sensitive	Not listed	open mature coniferous and mixed wood forest
Mammals				
long-tailed weasel	*Mustela frenata*	May Be At Risk	Not at Risk	Open country forages in aspen parkland and open forests.
Canada lynx	*Lynx canadensis*	Sensitive	Not at Risk	Boreal forest.
badger	*Taxidea taxus*	Sensitive	Not at Risk	Open country; grasslands and pastures.
northern long-eared bat	*Myotis septentrionalis*	May Be At Risk	Not listed	Forested areas close to waterbodies.

[1] COSEWIC 2000
[2] Semenchuk 1992, Fisher and Acorn 1999, Russell and Bauer 1993

Past studies have indicated that most sites have been severely disturbed by agricultural development. An examination of the general development areas suggests that new sites will likely be found in planned construction areas, since many of these locations have never received archaeological assessment in the past.

4.7.2. Palaeontological Remains

The locality east and southeast of Sherwood Park is underlain by geological structures associated with the Upper Cretaceous Edmonton formation, consisting of sandstones and silty shales. These deposits have been known to contain dinosaur remains, although the Royal Tyrrell Museum of Palaeontology classifies this area to have "unknown" palaeontological sensitivity to development (Tyrrell Museum of Palaeontology 1984 map).

5

5.0 ENVIRONMENTAL ASSESSMENT

5.1. Environmental Assessment Approach

The environmental assessment of the proposed roadway upgrading project involved the following procedure:

- Identifying issues/concerns related to the project;
- Identifying important ecosystem components which could be affected by project activities;
- Assessing the impact of project activities on ecosystem components using a number of effects assessment criteria;
- Identifying mitigation measures to reduce or eliminate the adverse effects of identified impacts;
- Identifying and assessing residual impacts of the activity after mitigation has been applied.

An initial scoping process was used to identify the major concerns associated with the road upgrade project and important ecosystem components that might be affected. The scoping process was based on project information, field surveys, previous studies in the area, conversations with knowledgeable individuals, and past experience with other roadway projects. The potential environmental issues/concerns and associated project activities identified for the project include the following:

- Loss of soil quality;
- Loss of soil quantity;
- Loss of land capability;
- Loss or alteration of terrestrial vegetation and wetland communities/wildlife habitat resulting from site clearing and road construction;
- Loss/disturbance of uncommon plant species resulting from site clearing;
- Sensory disturbance of wildlife during the construction phase due to equipment operation and human activity, and during the operation phase due to potential incremental traffic volumes.

Significance

Negligible:	Impacts affecting current land use, populations or a specific group of individuals at a localized level and/or over a short period in such a way as to be similar in effect to small random changes in the population due to environmental variances, but having no measurable effect on the population as a whole.
Minor Impact:	Impacts that are likely to be localized and/or short duration and are not expected to affect other land uses, trophic levels, or the integrity of the population overall, or historical resources.
Moderate Impact:	Impacts may result in measurable changes in ecosystem and historical components but are not expected to affect the long-term survival of a population or the overall integrity of an ecosystem, or historical resource.
Major Impact:	Impacts of sufficient severity that they threaten the continued survival of a population or the integrity of an ecosystem or a historical resource.

The potential impacts of the proposed project were initially assessed prior to mitigation measures, and therefore represented worse case scenarios. Because the Range Roads already exist, the assessment of the operation phase focused on any incremental environmental effects that the potential project may have over current conditions. Relevant mitigation measures were identified, where possible, to minimize project impacts. Residual impacts, those project effects that remain after feasible mitigation measures have been implemented, were then assessed using similar assessment criteria.

5.2. Soils

5.2.1. Loss of Soil Quality

Potential Issues/Concerns

Loss of soil quality may occur as a result of mixing subsoil material into salvaged topsoil, mixing non-contaminated soil with contaminated soil, soil compaction and accidental spills during construction and reclamation.

Impact Assessment

The potential impacts of soil mixing are expected to be of low to moderate magnitude and limited to the construction area. The probability of a deleterious substance accidentally spilling during construction is expected to be low. Any accidental spills that do occur are expected to be small and only impact the immediate spill area until cleaned up (Table 6).

Steep (>9%) slopes will have a High risk of erosion by water following construction until a vegetation cover is established.

Impact Assessment

Steep slopes are only located along Range Road 231, and extend over about one third (i.e., 1.3 km) the length of the entire roadway. Soil material eroded by water may accumulate both on and off-site, causing damage to plants where accumulations are significant. Potential soil losses during construction are anticipated to be low to moderate magnitude, isolated to the local area, and can be prevented by implementing appropriate erosion control measures (Table 6).

Mitigation

Short-term protection measures should be implemented immediately following construction on short, steep slopes (specific locations to be identified in the field). Control measures to protect soil from erosion by water during large rainstorm include limiting slopes (length and steepness) on soil storage piles and reducing flow rates in ditches by installing rills or berms.

5.2.3. Loss of Land Use

Potential Issue/Concern

Widening of existing roads will result in removal of land from the natural land base and present use.

Impact Assessment

Loss of some land capability is an unavoidable impact of potential road upgrading. The impact will result in a significant change in land use of the immediate area. However, the impact is very localized and the overall loss of land capability on a regional basis is small (Table 6).

Mitigation

The loss of land capability is an unavoidable impact that cannot be mitigated.

Table 6. Environmental assessment of potential impacts on selected ecosystem components as the result of the potential upgrading of Range Roads 231-233.

Potential Impact	Impact Type	Direction	Magnitude	Geographical Region	Duration	Significance
	Residual	Neutral	N/A	N/A	N/A	N/A
Smaller mammals	Project	Neutral/ Negative	L	Local	ST	Minor
	Residual	Neutral/ Negative	L	Local	ST	Negligible
Terrestrial breeding birds	Project	Negative	L	Local	ST	Minor
	Residual	Negative	L	Local	ST	Negligible-Minor
Waterfowl	Project	Negative	L-M	Local	ST	Minor
	Residual	Negative	L	Local	ST	Negligible
Raptors	Project	Negative	L	Local	ST	Minor
	Residual	Negative	L	Local	ST	Negligible
Amphibians	Project	Neutral	N/A	N/A	N/A	N/A
	Residual	Neutral	N/A	N/A	N/A	N/A
Direct Mortality: Site Clearing / Wildlife Vehicle Collisions						
Ungulates	Project	Negative	L / L-M	Local	ST / LT	Minor-Moderate
	Residual	Negative	L / L-M	Local	ST / LT	Minor-Moderate
Large carnivores	Project	Negative	L / L	Local	ST / LT	Minor
	Residual	Negative	L / L	Local	St / LT	Minor
Semi-aquatic furbears	Project	Neutral-Negative	L / L	Local	ST / LT	Minor
	Residual	Neutral-Negative	L / L	Local	ST / LT	Minor
Smaller mammals	Project	Negative	L / L	Local	ST / LT	Negligible-Minor
	Residual	Neutral-Negative	L / L	Local	ST / LT	Negligible
Terrestrial breeding birds	Project	Negative	L / L	Local	ST / LT	Minor
	Residual	Neutral-Negative	L / L	Local	LT	Negligible-Minor
Waterfowl	Project	Negative	L / L	Local	ST / LT	Minor
	Residual	Neutral-Negative	L / L	Local	LT	Negligible-Minor
Raptors	Project	Neutral-Negative	L / L	Local	ST / LT	Minor
	Residual	Neutral-Negative	L / L	Local	LT	Negligible
Amphibians	Project	Negative	L / L	Local	ST/Lt	Minor
	Residual	Negative	L / L	Local	Lt	Negligible
Disruption of Wildlife Movements						
Ungulates	Project	Negative	L	Local	LT	Minor-Moderate
	Residual	Negative	L	Local	LT	Minor-Moderate
Large carnivores	Project	Negative	L	Local	LT	Minor
	Residual	Negative	L	Local	LT	Minor
Semi-aquatic furbears	Project	Negative	L	Local	Lt	Minor

expected. Some loss of willow shrubland and mixedwood forest may also occur, although these habitats tend to be interspersed with other communities, making habitat delineation difficult at the level of mapping undertaken.

Table 7. Vegetation/cover types adjacent to Range Roads 231, 232, and 233 between Wye Road and Highway 628 (metres each habitat encompasses adjacent to either side of the alignment).

Vegetation/Cover Types	Range Road 231		Range Road 232		Range Road 233	
	West Side (m)	East Side (m)	West Side (m)	East Side (m)	West Side (m)	East Side (m)
Aspen –aspen/ balsam poplar	1285	970	1790	1040	610	590
Willow shrubland	-	170	-	-	-	-
Sedge/grass meadows	-	-	240	120	290	220
Wetlands/marshes	130	-	40	-	120	220
Agriculture/ Anthropogenic	1785	2060	1130	2040	2180	2230

Some impact to adjacent vegetation is likely to occur as the result of dust and erosion during construction. However, these effects are considered to be small, localized, and temporary. Sediment input into wetlands may temporarily reduce primary productivity in wetlands, having minor to moderate impacts; however, no long-lasting impacts are anticipated.

Accidental spills of deleterious substances may occur during construction, operation and maintenance of the roadways. Impacts on terrestrial vegetation are considered to be minor, as spills will be largely contained in ditches and the area of effect will be small. Accidental spills occurring in or draining into wetlands may have a low to high impact on individual wetlands, dependent on characteristics of the spill and the size of the wetland. Ecological effects, however, are expected to be temporary and the probability of occurrence is anticipated to be low.

Mitigation

The following mitigation measures are recommended to minimize or avoid impacts to vegetation and wetlands in the study area:

Mitigation

A rare plant survey should be conducted prior to vegetation clearing along chosen alignments that route through natural habitat. Alterations in alignments or transplantation should be considered if rare species are encountered.

5.4. Wildlife

The impacts of roadways on wildlife include habitat loss, habitat disturbance adjacent to the roadway, the disruption of animal movements and dispersal, and direct mortality (Noss 1995, Ruediger 1996, Jackson 1999). The effects of transportation developments may lead to a change in composition and abundance of wildlife species for the area involved (Bekker 1998).

5.4.1. Habitat Loss and Alteration

Potential Issue/Concern

Wildlife habitat in the study area will be reduced through vegetation clearing, and the potential infilling of wetland habitat. Sedimentation into wetland areas may also reduce the suitability of these areas for wildlife. The suitability of adjacent habitats for wildlife may also be temporarily reduced as a result of dust, erosion, and accidental spills during construction.

Impact Assessment

Overall, loss of natural wildlife habitat as a result of the potential road upgrades is relatively small. Much of the habitat adjacent to the current roads is considered to be of only moderate or lower quality for wildlife because of the high degree of disturbance and fragmentation of habitats in the area, particularly along Range Road 233. In addition, potential alteration of terrestrial vegetation communities is unlikely to have a significant affect on wildlife populations in the area. Sedimentation into wetlands, particularly during the growing season, may reduce the suitability of these habitats for water birds and semi-aquatic furbearers, although the impact will be temporary with no long-lasting effects. Overall, impacts to wildlife are considered to be adverse, minor, and permanent (Table 6). However, because of the high ecological function associated with wetland areas and the increase in wetland loss within the parkland area through both natural and man-made causes, loss of wetland habitat is considered to be of importance. As well, the upgrading of roads within Strathcona County continues to reduce terrestrial wildlife habitats. Although habitat losses on an individual basis may be small, the cumulative effects of road developments, residential developments, and agriculture within the County are significant.

Mitigation

Construction should be scheduled to avoid the breeding and nesting/natal period for migratory birds and mammals. The recommended timing constraints for migratory birds in this region are considered to be from April 15 – July 31 (J. Folinsbee, Alberta Sustainable Development, personal communication). Strathcona County may further restrict clearing of natural habitats from April through September (L. Girvan, Strathcona County, personal communication).

5.5.2. Operation

Potential Issues/Concerns

An incremental increase in traffic volumes, and thus sensory disturbance, along upgraded sections of Range Roads 231-233 may result in a further decrease in use of natural habitats along the roadway by wildlife. Reduction in habitat use near roads has been documented for bird communities (Ferris 1979, Foppen 1991), carnivores (Paquet 1995), and deer (Rost and Bailey 1979), and appears to be related to traffic volumes. The zone of impact of traffic-related disturbance may vary by species and season.

Impact Assessment

As the roadway has existed for a considerable time, wildlife have likely habituated to traffic noise occurring along Range Roads 231-233, or have already altered their use of habitat adjacent to the roadway. The incremental increase in traffic noise/activity resulting from anticipated increases traffic volume associated with the upgrading project may further reduce suitability of adjacent habitats for wildlife. Dependent on traffic volumes, the magnitude of the impact may range from low to moderate, but is considered to have only a minor effect on wildlife because of the localized nature of the impact (Table 6).

Mitigation

No mitigation is recommended.

5.6. Direct Mortality

5.6.1. Construction

Potential Issue/Concern

Some mortality of wildlife may result from construction activities that result in the removal of or damage to natural habitats. Small mammals, amphibians, and immature birds and

control livestock and are large enough to cause reportable damage to most vehicles. The resulting average collision frequency is 0.75, 1.0, and 0.63 collisions/km/year for Range Road 233, Range Road 232, and Range Road 231, respectively (Table 8). These collision rates are lower than the 1.59 collisions/km/year reported for Highway 628 (Nietfeld and Brusnyk 2003), but higher than those reported for Highway 629 (0.29 collisions/km/year) and Township Road 520 (0.49 collisions/km/year) east of the study area (Skinner 2000, Nietfeld and Brusnyk 2002).

The average daily traffic count along the Range Roads 233, 232, and 231 was 8818, 5192, and 4640 vehicles in 2001, respectively. The average daily traffic counts have increased significantly since 1996/1997. Traffic volumes are highest along Range Road 233, and decrease eastward, being lowest along Range Road 231 (Table 8). Traffic volumes along each Range Road are also highest near Wye Road and decrease southward as Highway 628 is approached, by approximately 75%. These traffic patterns likely reflect the commuter traffic between Sherwood Park and rural residential developments within the study area. Despite increasing traffic volume in the last 5 years, animal/vehicle collisions along the Range Roads have not exhibited a clear pattern, and there is not a linear relationship between traffic volumes and animal/vehicle collisions (Figures 4 and 5).

It is likely that greater traffic volumes along Range Roads 231-233 as a result of increased development in the area will result in an increase in the number of animal/vehicle collisions, at least initially. However, it is difficult to predict the magnitude of the impact. The physical size of the roadway and increased traffic volumes may deter some individuals from crossing. However, these same factors will likely reduce the survival of those individuals attempting to cross. As development in the area increases, the overall capability of the area to support wildlife may decline, which may reduce the potential for animal vehicle collisions. Overall, an incremental increase in animal/vehicle collisions in the area is considered to be negative in direction, low to moderate in magnitude, local in extent, long-term in duration, and of minor to moderate significance (Table 6), depending on whether 1 or all 3 roadways are upgraded.

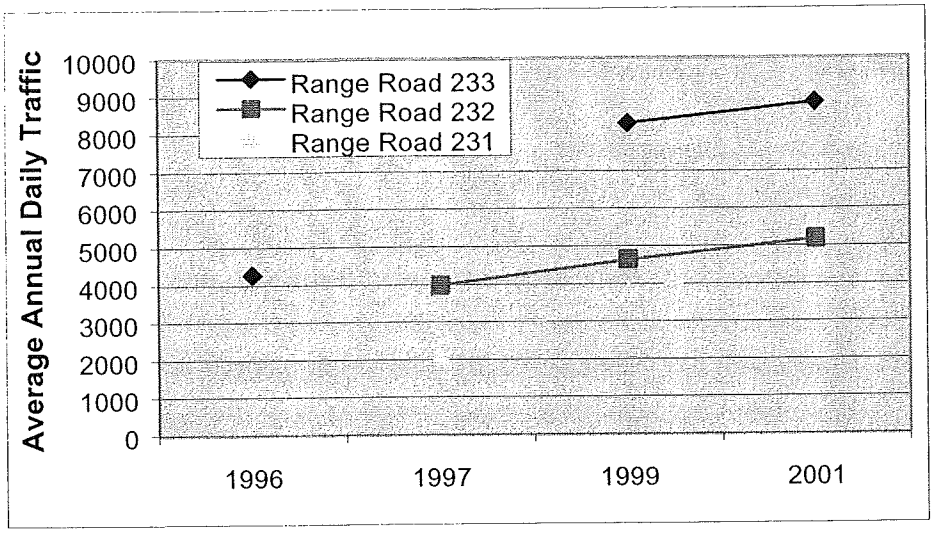


Figure 4. Annual average daily traffic count along Range Roads 231-233 between Wye Road and Highway 628 for 1996-2001.

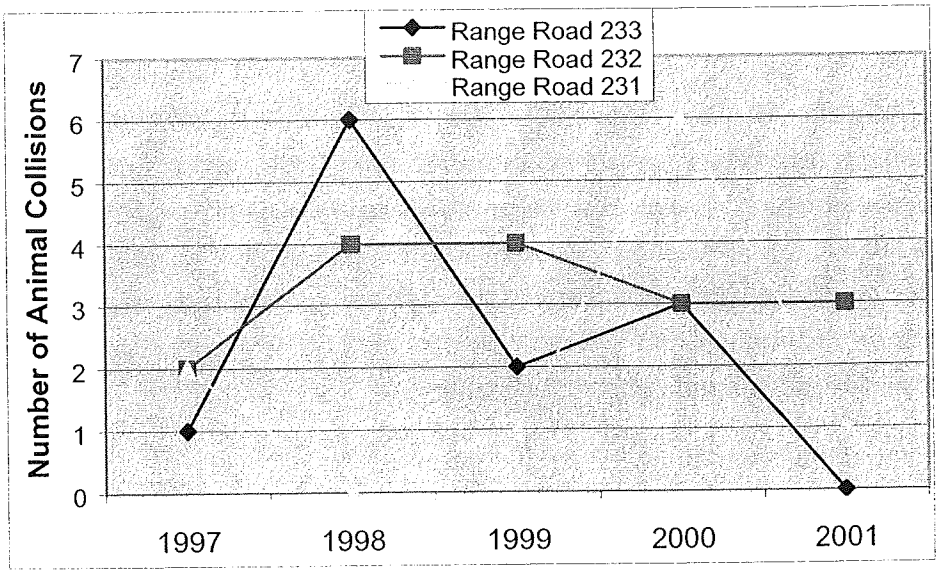


Figure 5. Animal/vehicle collisions along Range Roads 231-233 between Wye Road and Highway 628 for 1997-2001.

Mitigation

and minor to moderate in significance, depending on whether or not all 3 roads are upgraded (Table 6).

Mitigation

No mitigation per se is recommended. Drainage culverts may provide an alternative to crossing over the road surface for some mammals and herptiles (Clevenger and Waltho 1999).

5.7. Historical Resources

Issues and Concerns

Upgrading of the Range Roads may disturb historic resources within the study area. Historical resources are protected under the Alberta Historical Resources Act.

Impact Assessment

Previous archaeological assessment in the general Sherwood Park locality has usually resulted in the discovery of precontact archaeological sites. Most of these sites have been disturbed by previous development activity, particularly agriculture. Recent commercial and residential development in the study area, especially adjacent to the existing roads, would have also created significant disturbance to any potential archaeological resources. Where forest cover still occurs within the study area, the potential for any archaeological resources to be discovered undisturbed may be greater.

All existing roadways may have impacted heritage resources in the past. An examination of the general study area suggests that new sites will likely be found in potential road construction areas, since many of these locations have never received archaeological assessment in the past. It is possible that some new sites that are discovered may be undisturbed, although expansion of existing roads into commercial and residential locations greatly reduces the probability of this occurrence. The potential upgrading of Range Roads 231-233 appears to be extensive, and may create severe impacts to any potential heritage resources that are contacted through either widening of the existing rights-of-way or creation of entirely new rights-of-way.

Range Road 231

Widening of Range Road 231 will not likely have a significant affect on potential cultural resources. Approximately half of the road passes through areas of existing disturbance related to agriculture and residential development. The road passes through one small

At a minimum, it is recommended that the following identified specific locations receive detailed archaeological inspections to determine if archaeological remains are present and are of sufficient integrity to require protection or mitigation as defined by the Alberta Historical Resources Act:

- RR232 B along Range Road 232 (Figure 6); and
- RR233 A, B, and C along Range Road 233 (Figure 6).

There appear to be no significant historical locations along Range Road 231, therefore, no detailed inspections are recommended for potential upgrading of this road alignment.

It is also recommended that an in-field overview of potential road upgrading be undertaken prior to construction, after the new rights-of-way routes are staked, for all 3 Range Roads.

Residual Effects

Residual effects, those effects that remain after mitigation measures have been implemented, are also summarized in Table 6. Mitigation measures will reduce the significance of many of the potential impacts associated with the potential project. Residual impacts are generally considered to be negligible to minor in significance. Some loss and fragmentation of vegetation communities/wildlife habitat types will still occur, although recommended habitat compensation initiatives should mitigate losses. Sensory disturbance and wildlife mortality during construction will temporarily reduce wildlife abundance near the roadway. Some incremental increase in wildlife/vehicle collisions may occur, which may have minor to moderate effects on wildlife populations. An incremental disruption of wildlife movements may also occur due to widening of the road(s) and increased traffic, although this is unlikely to have a significant effect on populations in the area. A relatively small amount of land capability will be lost, and negligible impacts to historical resources are anticipated following detailed field inspections prior to construction.

5.8. Environmental and Historical Resources Overview Summary

An environmental and historical resources overview was conducted for Ranges Roads 231, 232, and 233 between Wye Road and Highway 628. Dark Gray Luvisolic soil is the most dominant soil type, although Orthic Gray Luvisolic and Dark Gray Chernozemic soils are also common. Low-lying areas contain various Gleysolic and shallow Organic soils that are usually wet. Residential and agricultural have altered much of the land base in the vicinity of the roads. Natural vegetation along the roadways consists primarily of aspen/balsam forest, although aspen forest, mixedwood forest, willow shrubland, cattail marshes, sedge/grass meadows, and wetland complexes are also present. A variety of wildlife is expected to inhabit the area, although habitat fragmentation and human disturbance have likely reduced the quality of remaining wildlife habitat.

The potential upgrading of Range Roads 231-233 will result in some minor impacts to soil, vegetation, wildlife, and wetland resources in the vicinity of the proposed alignments. Relatively small losses of land capability and natural vegetation are anticipated. In addition, some habitat alteration may occur as the result of sedimentation, erosion, dust, weed invasion, and accidental spills, although areas affected are expected to be small and the effects localized. Overall, these impacts are unlikely to adversely affect the integrity of vegetation or wildlife populations in the area. Sensory disturbance during construction may affect wildlife use of habitats adjacent to the roadway. In addition, some mortality of wildlife

6

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7.0 PERSONAL COMMUNICATIONS

J. Folinsbee, Wildlife Biologist, Alberta Sustainable Resource Development

L. Girvan, Engineering and Environmental Planning Department, Strathcona County, Sherwood Park, Alberta, Canada.

W. Roberts, Museum Curator, Biological Sciences, University of Alberta, Edmonton, Alberta, Canada.

L. Takats, Wildlife Biologist, Alberta Sustainable Resource Development

R. Yanitski, Engineering and Environmental Planning Department, Strathcona County.

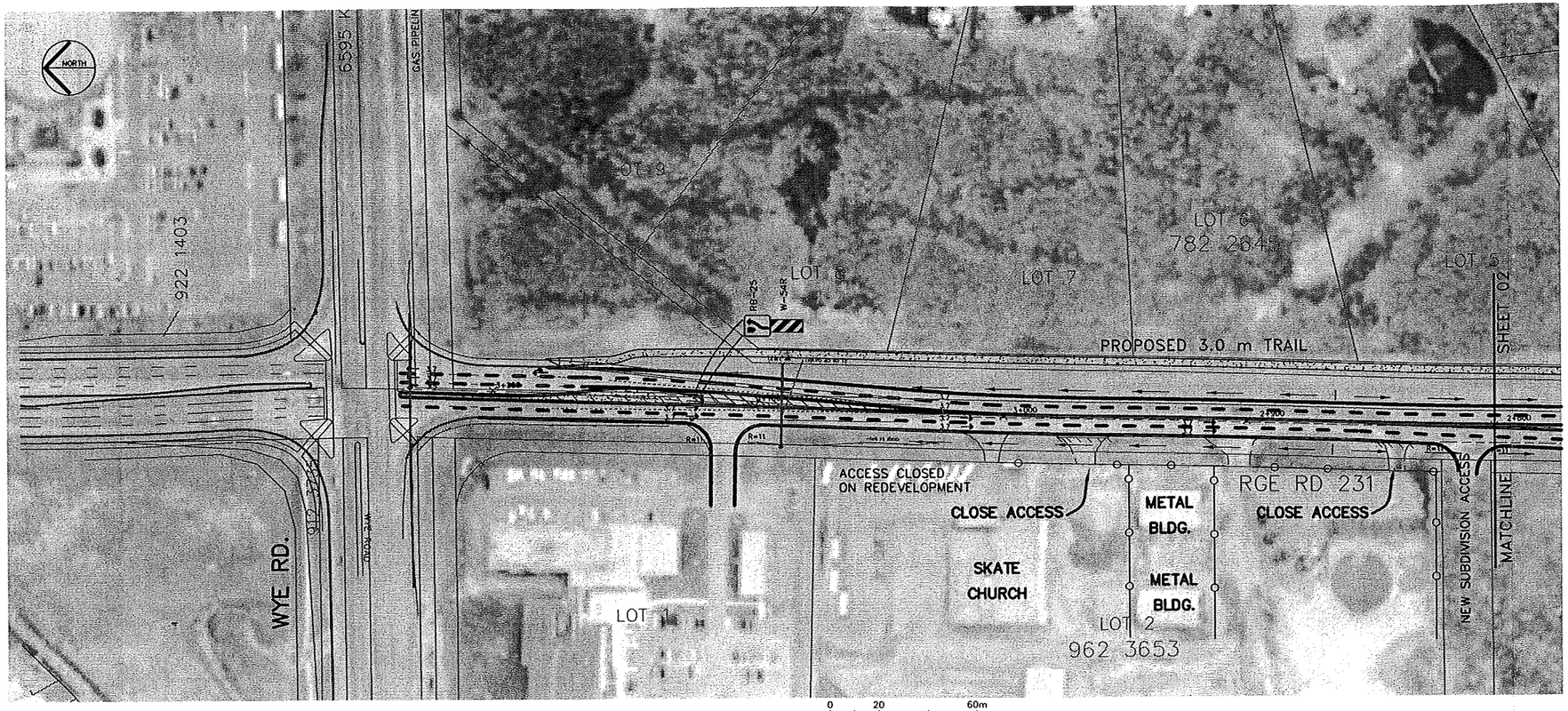
Appendix 2. Common names and scientific names of bird species occurring in the vicinity of the study area (Nietfeld and Westworth 1997, Nietfeld and Brusnyk 2002, 2003, Nietfeld (personal data), Semenchuk 1992).

Species	Scientific Name	Nietfeld and Brusnyk 2003 Highway 628	Nietfeld and Westworth 1997, Highway 830	Nietfeld and Brusnyk 2002 Township Road 520	Breeding Bird Atlas, Semenchuk 1992
Red-necked grebe	*Podiceps grisegena*		X	X	X
Pied-billed grebe	*Podilymbus podiceps*		X		
Horned Grebe	Podiceps auritus				X
Eared grebe	*Podiceps nigricollis*				X
Canada goose	*Branta canadensis*		X	X	X
Mallard	Anas platyrhynchos	X	X	X	X
Gadwall	Anas strepera		X	X	X
American wigeon	*Anas americana*		X	X	X
Blue-winged teal	Anas discors		X		X
Green-winged teal	Anas crecca		X	X	
Cinnamon teal	Anas cyanoptera				X
Northern shoveler	Anas clypeata			X	X
Northern pintail	Anas acuta			X	
Canvasback	*Aythya valisineria*		X		X
Redhead	Aythya americana	X	X		X
Ring-necked duck	*Aythya collaris*		X		X
Lesser scaup	*Aythya affinis*	X	X	X	X
Bufflehead	*Bucephala albeola*		X	X	X
Common goldeneye	Bucephala clangula		X		X
Rudy duck	Oxyura jamaicensis		X	X	X
American Coot	Fulica americana		X	X	X
Sora	Porzana carolina		X		
Killdeer	Charadrius vociferus		X	X	X
Lesser Yellowlegs	Tringa flavipes				X
Spotted sandpiper	Actitis macularia	X	X		X
Wilson's phalarope	*Steganopus tricolor*				X
Common snipe	Gallinago gallinago	X	X		X
Franklins gull	*Larus pipixan*		X		
Ring-billed gull	*Larus delawarensis*			X	X
Black tern	*Childonias niger*		X		X
Swainson's hawk	Buteo swainsoni				X
Red-tailed hawk	Buteo jamaicensis	X	X	X	X
Northern harrier	*Buteo swainsoni*		X		
American kestrel	Falco sparverius				X
Merlin	Falco columbarius				X
Great-horned owl	Bubo virginianus		X		
Downy woodpecker	Picoides pubescens	X	X	X	
Hairy woodpecker	Picoides villosus	X		X	
Northern flicker	Colaptes auratus		X		
Western wood-peewee	Contopus sordidulus	X	X	X	X
Alder flycatcher	Empidonax alnorum	X	X		
Least flycatcher	Empidonax minimus	X	X	X	X
Eastern kingbird	Tyrannus tyrannus				X

Appendix 3. Historical resources overview of the Range Road 231-233 and Township Road 530 study areas.

APPENDIX H

PLAN AND PROFILES OF RANGE ROADS



EARTH TECH
A Tyco International LTD Company

LEGEND

PROFILE

- EXISTING GROUND CL
- ASBUILT EAST DITCH
- ASBUILT WEST DITCH
- ASBUILT CENTERLINE

PLAN

- PROPERTY LINE
- FENCE
- NUL/GAS LINE
- TAU/POWER LINE
- AGT/TELEPHONE LINE
- EXISTING RIGHT DITCH
- EXISTING LEFT DITCH
- BACKSLOPE LIMITS
- HORIZONTAL BASELINE
- ORIG. TOPO FEATURES ie. ROAD , BLDG.
- TREE
- BUSH
- SLOUGH/WATER
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- CULVERT
- PROPOSED PROPERTY LINE
- PROPOSED SIDEWALK

NOTES:

1. MINIMUM PRIVATE APPROACH RADIUS 6.0m, MINIMUM ROADWAY INTERSECTION OR COMMERCIAL RADIUS 12.0m UNLESS OTHERWISE SPECIFIED.
2. ALL UTILITIES SHOWN ARE REPRESENTATIVE ONLY AND MUST BE LOCATED IN FIELD BY THE PROPER AUTHORITIES PRIOR TO CONSTRUCTION COMMENCEMENT.
3. ALL REPLACEMENT CULVERTS TO BE CMP, MIN 450ø FOR PRIVATE APPROACHES, 600ø FOR THROUGH GRADES UNLESS OTHERWISE NOTED. ALL CULVERTS TO BE LOCATED AT END OF RADIUS TO MINIMIZE REQUIRED LENGTH OF CULVERT.
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5. USE OF MUNICIPAL RESERVE LANDS MUST BE APPROVED BY STRATHCONA COUNTY COMMUNITY & ENVIRONMENTAL PLANNING, 464-8117.
6. ALL TRAFFIC CONTROL SIGNS TO BE REPLACED UPON COMPLETION OF THE ROAD RECONSTRUCTION PRIOR TO REOPENING THE ROAD TO THE PUBLIC.

No.	DATE	BY	ENG	SUBJECT

REVISIONS

Strathcona County

ENGINEERING & ENVIRONMENTAL PLANNING
2001 SHERWOOD DRIVE
SHERWOOD PARK, ALBERTA, T8A 3W7

JOB NUMBER	---
SURVEY, DATE & BOOK	
DRAWN	---
DESIGNED	---
CHECKED	---
APPROVED	---
APPROVED	---

ENGINEER

REGISTERED ENGINEERING TECHNOLOGIST

PERMIT

DATE
2003/MM/DD

SCALE
H= 1:1000
V= 1:100
PLOT DWG AT 1=1

DRAWN by
APL

RANGE ROAD 231
FROM WYE ROAD TO TWP. RD. 522
TITLE
STA. 3+300 TO STA. 2+800

DRAWING NUMBER	REV.	SHEET
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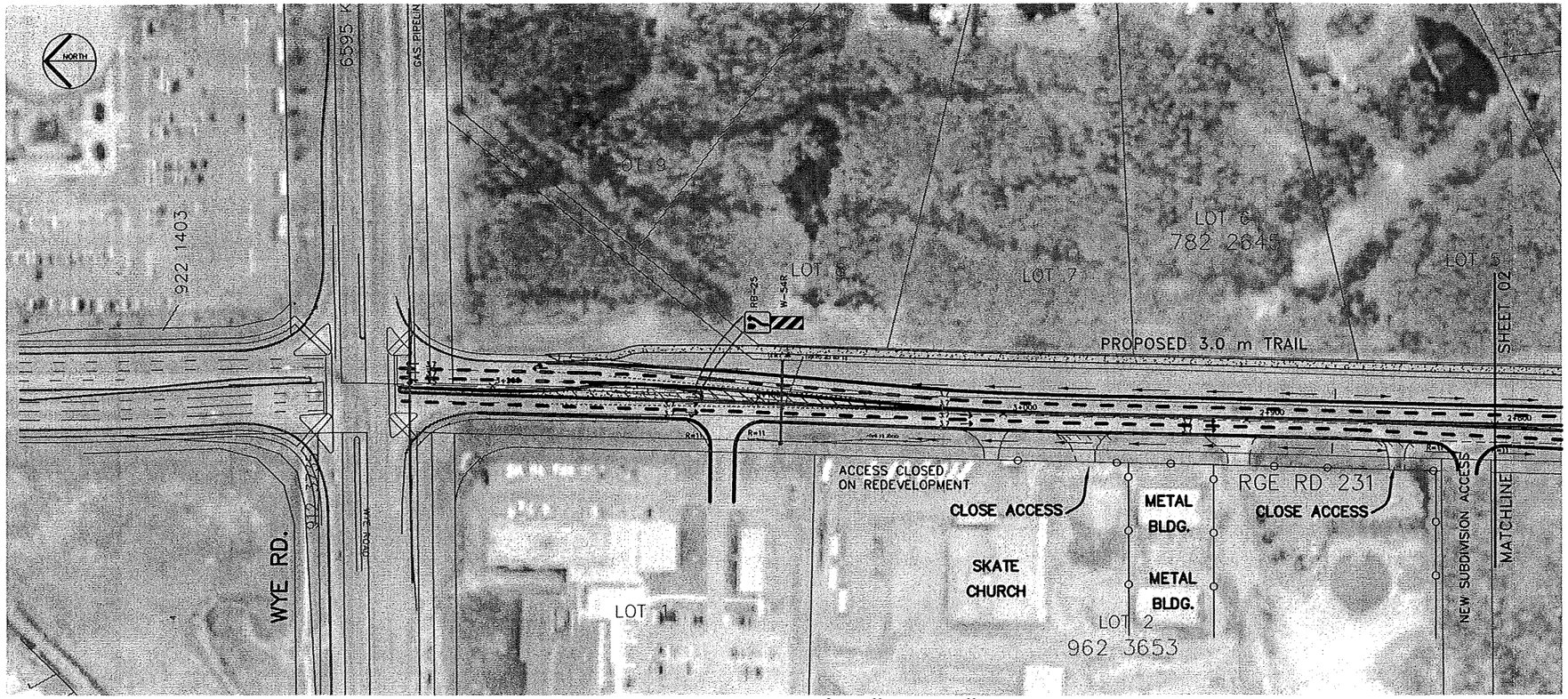

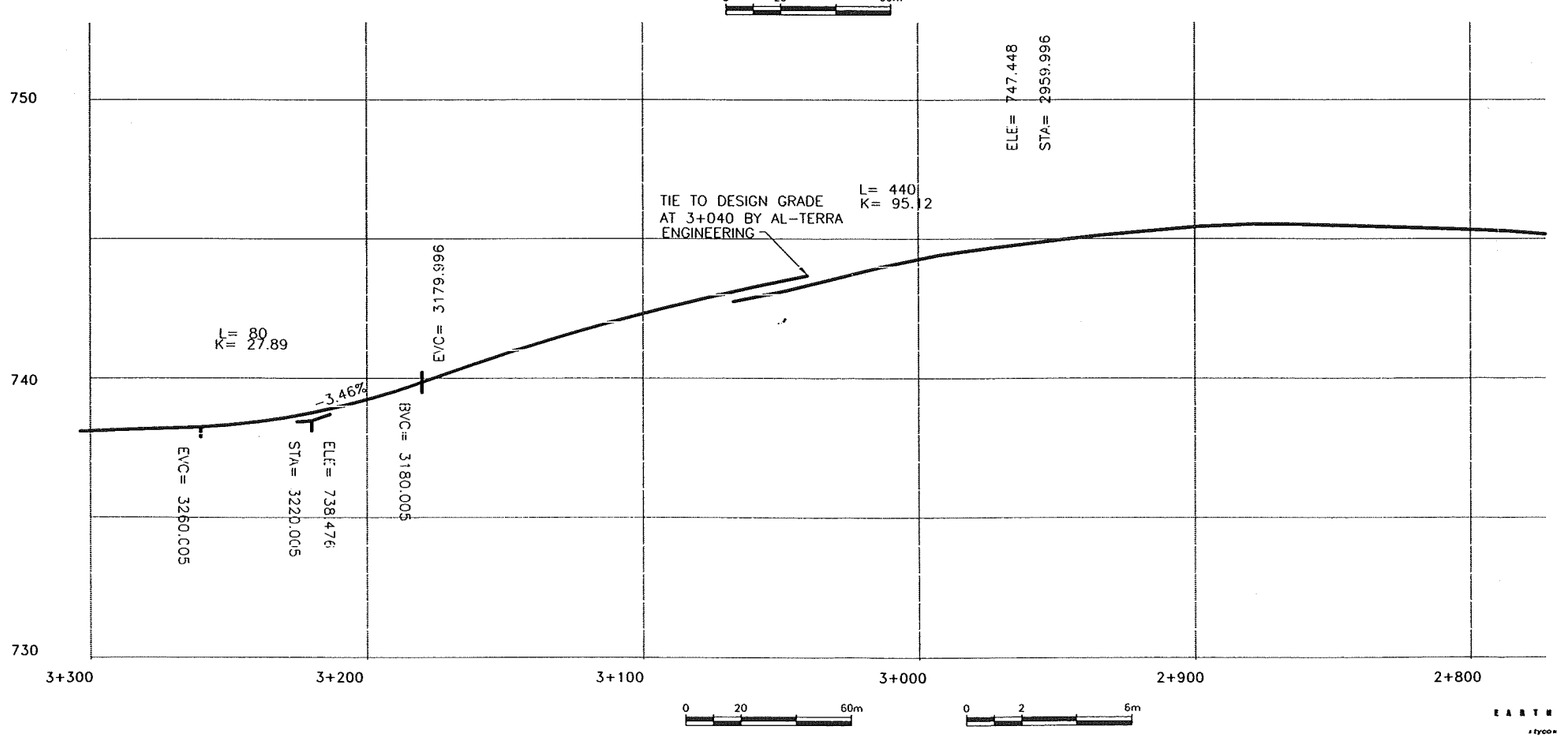

LEGEND

PROFILE

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DATE 2003/MM/DD	PERMIT
SCALE H= 1:1000 V= 1:100 PLOT DWG AT 1=1	
DRAWN by APL	

RANGE ROAD 231
FROM WYE ROAD TO
TWP. RD. 522
TITLE
STA. 3+300 TO
STA. 2+800

DRAWING NUMBER	REV.	SHEET
231 SHEET 01	A	1/6

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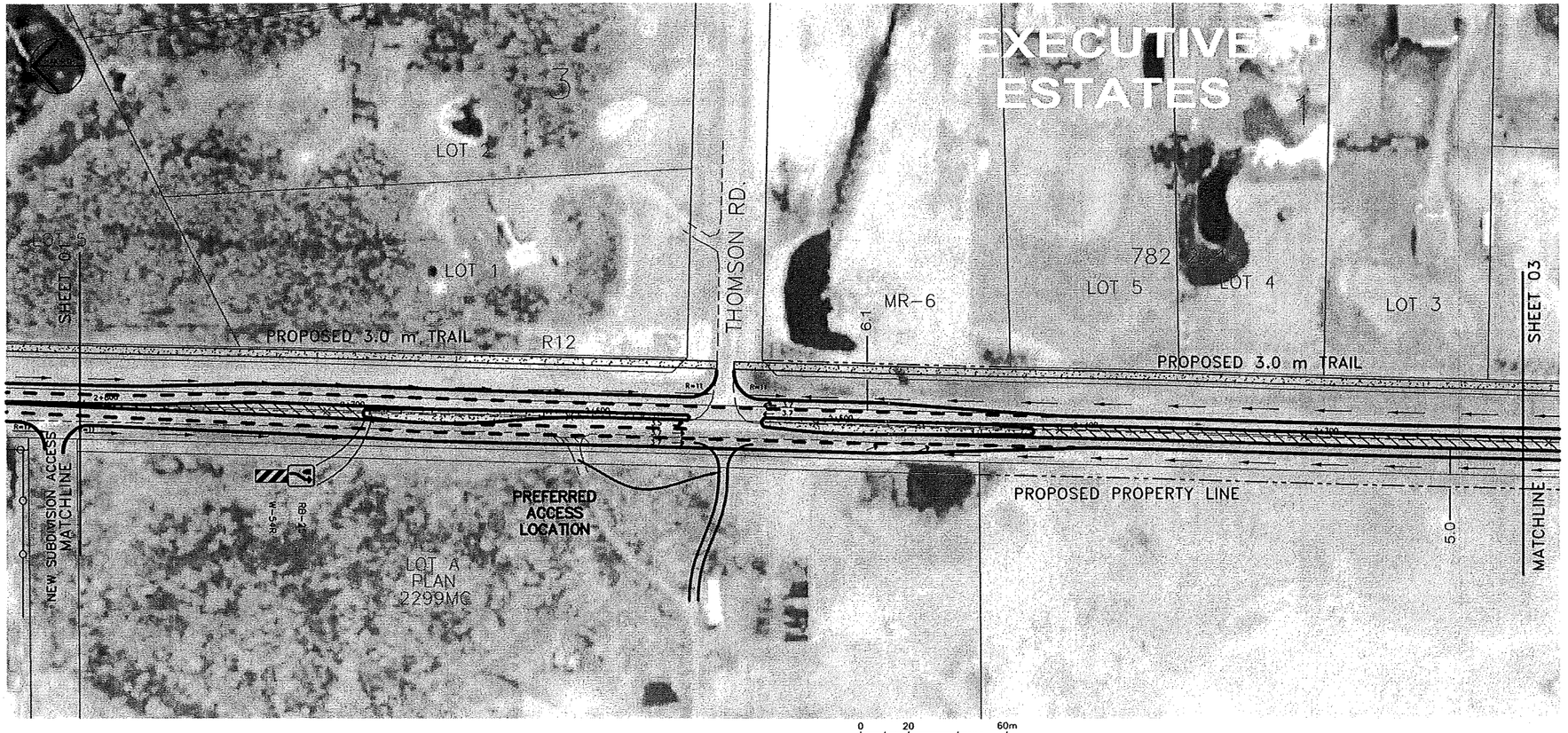

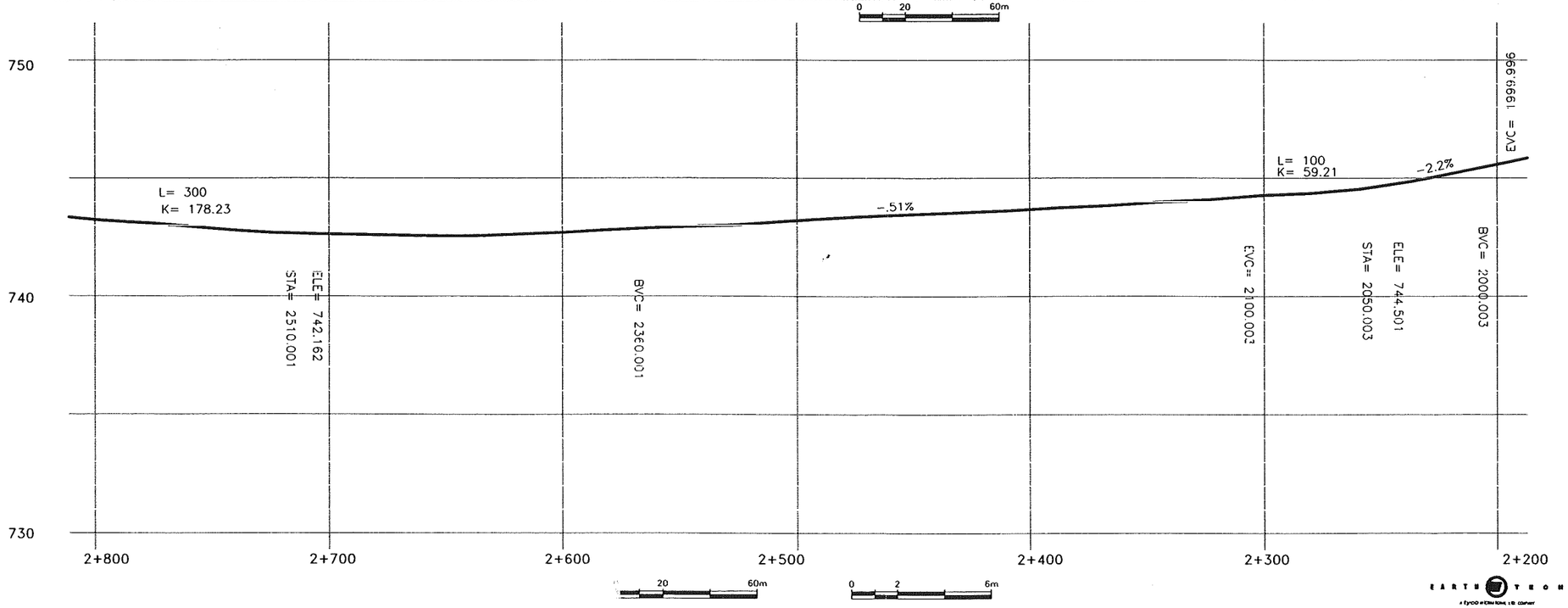

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SHERWOOD PARK, ALBERTA, T8A 3W7

JOB NUMBER	---
SURVEY, DATE & BOOK	
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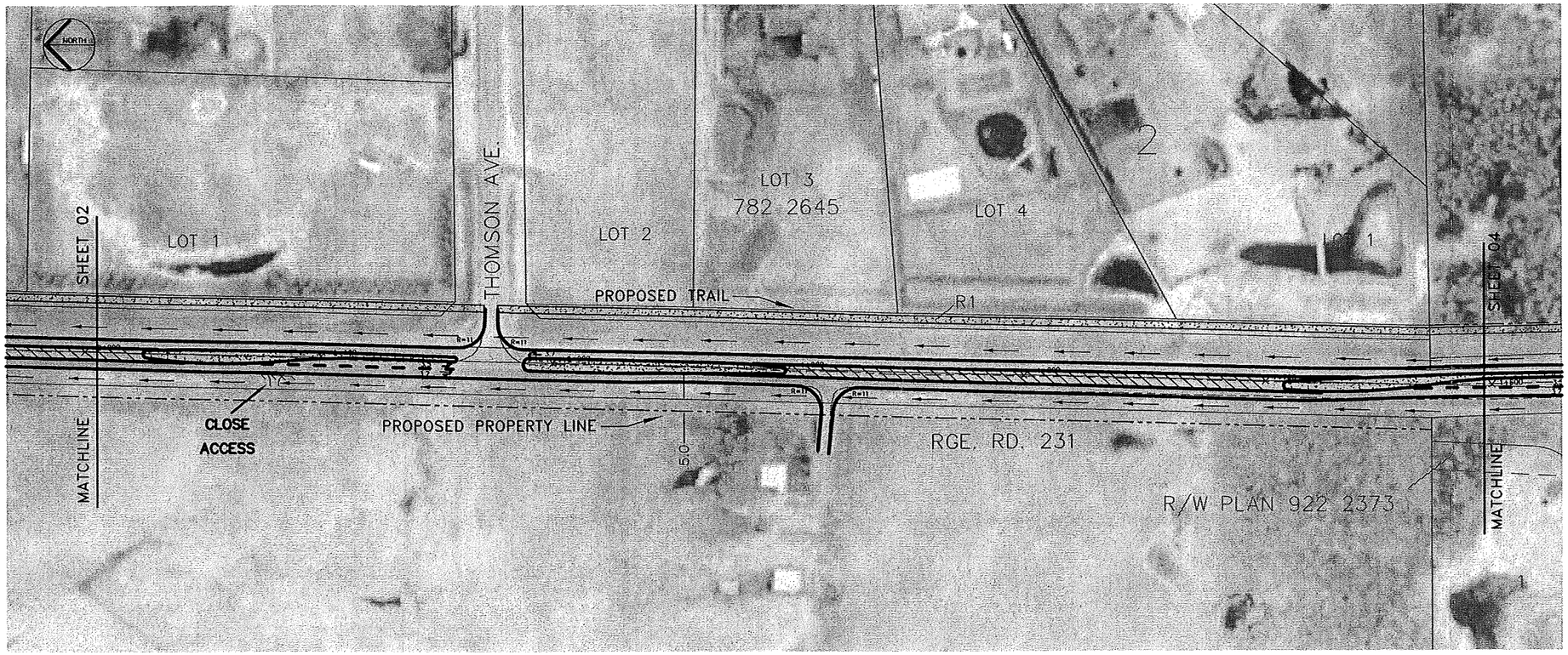
APPROVED	---
APPROVED	---

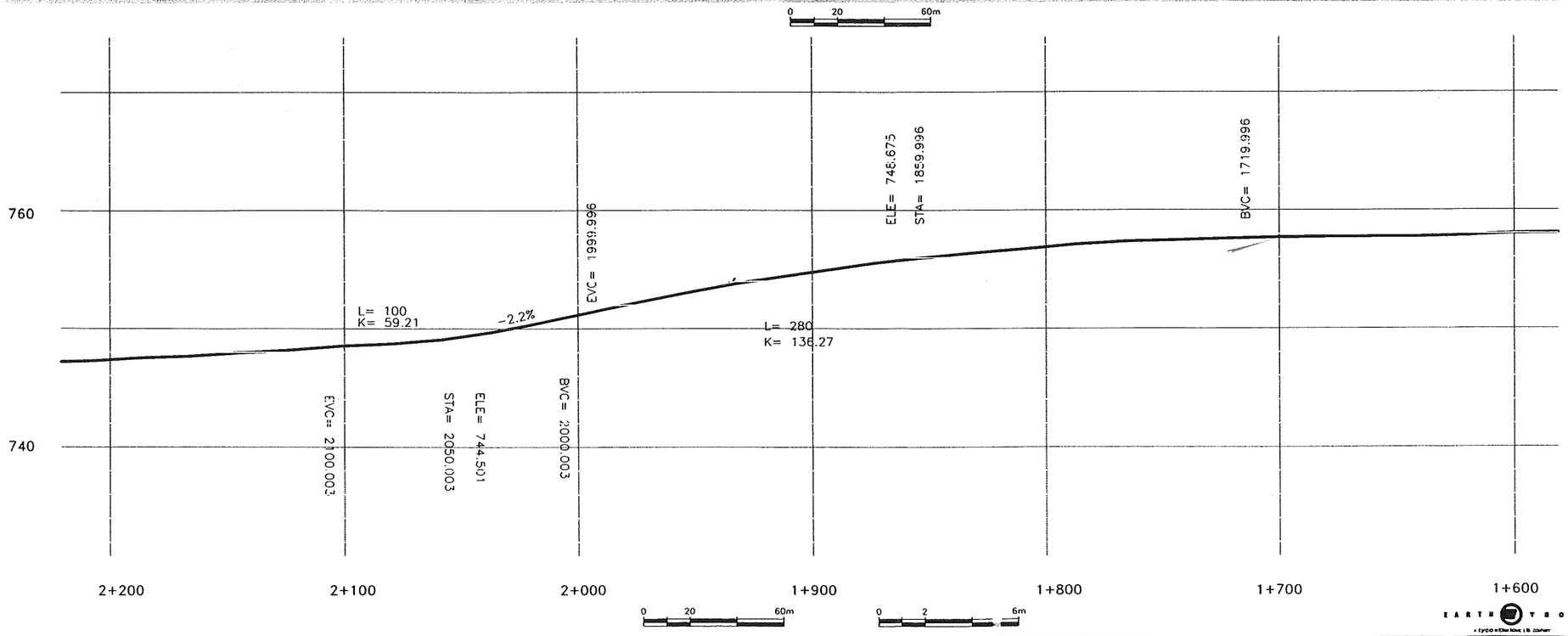
ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST | PERMIT

DATE 2003/MM/DD	
SCALE H= 1:1000 V= 1:100 PLOT DWG AT 1=1	
DRAWN by APL	

RANGE ROAD 231
FROM WYE ROAD TO
TWP. RD. 522
TITLE
STA. 2+800 TO
STA. 2+200

DRAWING NUMBER	REV.	SHEET
231 SHEET 02	A	2/6





LEGEND

PROFILE

- EXISTING GROUND CL
- ASBUILT EAST DITCH
- ASBUILT WEST DITCH
- ASBUILT CENTERLINE

PLAN

- PROPERTY LINE
- FENCE
- GAS/GAS LINE
- TAU/POWER LINE
- AGT/TELEPHONE LINE
- EXISTING RIGHT DITCH
- EXISTING LEFT DITCH
- BACKSLOPE LIMITS
- HORIZONTAL BASELINE
- ORIG. TOPO FEATURES ie. ROAD , BLDG.
- TREE
- BUSH
- SLOUGH/WATER
- DIRECTION OF FLOW
- CULVERT
- PROPOSED PROPERTY LINE
- PROPOSED SIDEWALK

NOTES:

1. MINIMUM PRIVATE APPROACH RADIUS 6.0m, MINIMUM ROADWAY INTERSECTION OR COMMERCIAL RADIUS 12.0m UNLESS OTHERWISE SPECIFIED.
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3. ALL REPLACEMENT CULVERTS TO BE CMP, MIN 450ø FOR PRIVATE APPROACHES, 600ø FOR THROUGH GRADES UNLESS OTHERWISE NOTED. ALL CULVERTS TO BE LOCATED AT END OF RADIUS TO MINIMIZE REQUIRED LENGTH OF CULVERT.
4. MINIMUM WIDTH 6.5m FOR PRIVATE APPROACHES OR TAPERED TO MATCH EXISTING.
5. USE OF MUNICIPAL RESERVE LANDS MUST BE APPROVED BY STRATHCONA COUNTY COMMUNITY & ENVIRONMENTAL PLANNING, 464-8117.
6. ALL TRAFFIC CONTROL SIGNS TO BE REPLACED UPON COMPLETION OF THE ROAD RECONSTRUCTION PRIOR TO REOPENING THE ROAD TO THE PUBLIC.

No.	DATE	BY	ENG	SUBJECT

REVISIONS

Strathcona County

ENGINEERING & ENVIRONMENTAL PLANNING
2001 SHERWOOD DRIVE
SHERWOOD PARK, ALBERTA, T8A 3W7

JOB NUMBER	
SURVEY, DATE & BOOK	
DRAWN	
DESIGNED	
CHECKED	
APPROVED	
APPROVED	

ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

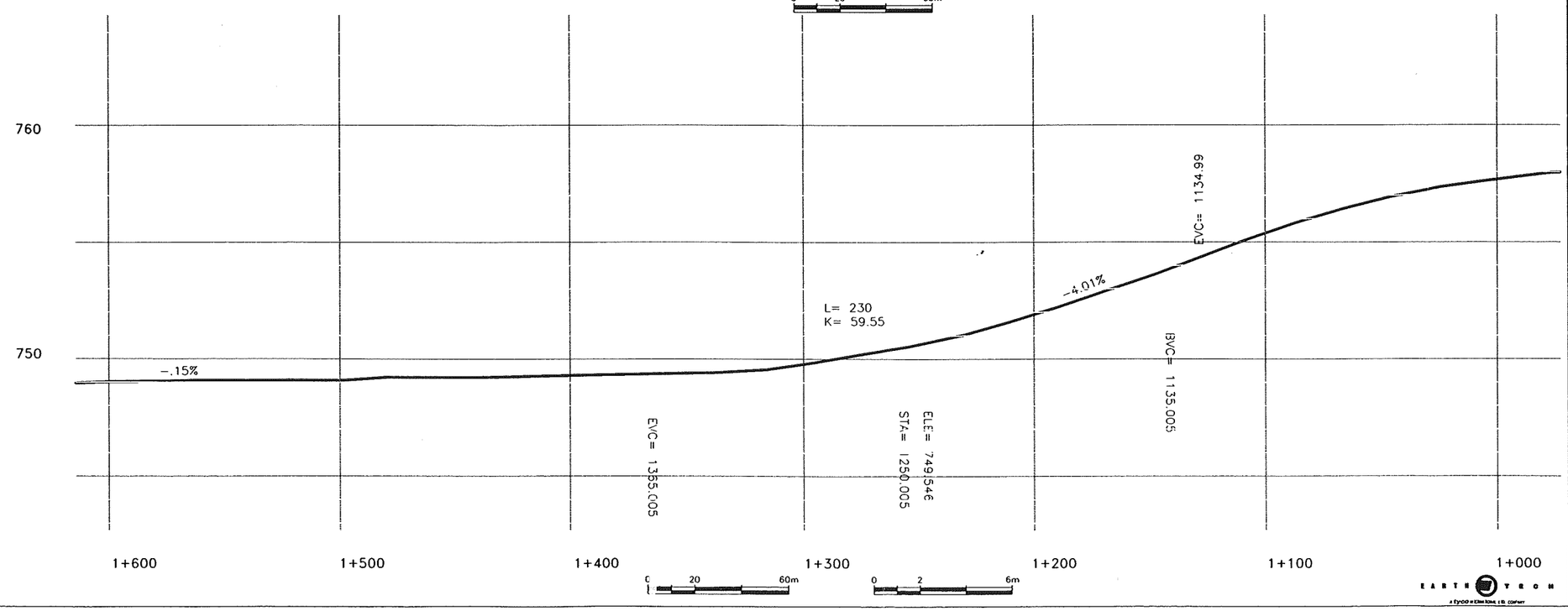
DATE 2003/MM/DD	FORMAT
SCALE H= 1:1000 V= 1:100 PLOT DWG AT 1=1	
DRAWN by APL	

RANGE ROAD 231
FROM WYE ROAD TO
TWP. RD. 522
TITLE
STA. 2+200 TO
STA. 1+600

DRAWING NUMBER	REV.	SHEET
231 SHEET 03	A	3/6

EARTH TECH
A TYCO INTERNATIONAL LTD. COMPANY





LEGEND

PROFILE

- EXISTING GROUND CL
- ASBUILT EAST DITCH
- ASBUILT WEST DITCH
- ASBUILT CENTERLINE

PLAN

- PROPERTY LINE
- FENCE
- NUL/GAS LINE
- TAU/POWER LINE
- AGT/TELEPHONE LINE
- EXISTING RIGHT DITCH
- EXISTING LEFT DITCH
- BACKSLOPE LIMITS
- HORIZONTAL BASELINE
- ORIG. TOPO FEATURES ie. ROAD , BLDG.
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No.	DATE	BY	ENG	SUBJECT

REVISIONS

Strathcona County
ENGINEERING & ENVIRONMENTAL PLANNING
2001 SHERWOOD DRIVE
SHERWOOD PARK, ALBERTA, T8A 3W7

JOB NUMBER	---
SURVEY, DATE & BOOK	
DRAWN	---
DESIGNED	---
CHECKED	---
APPROVED	---
APPROVED	---

ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

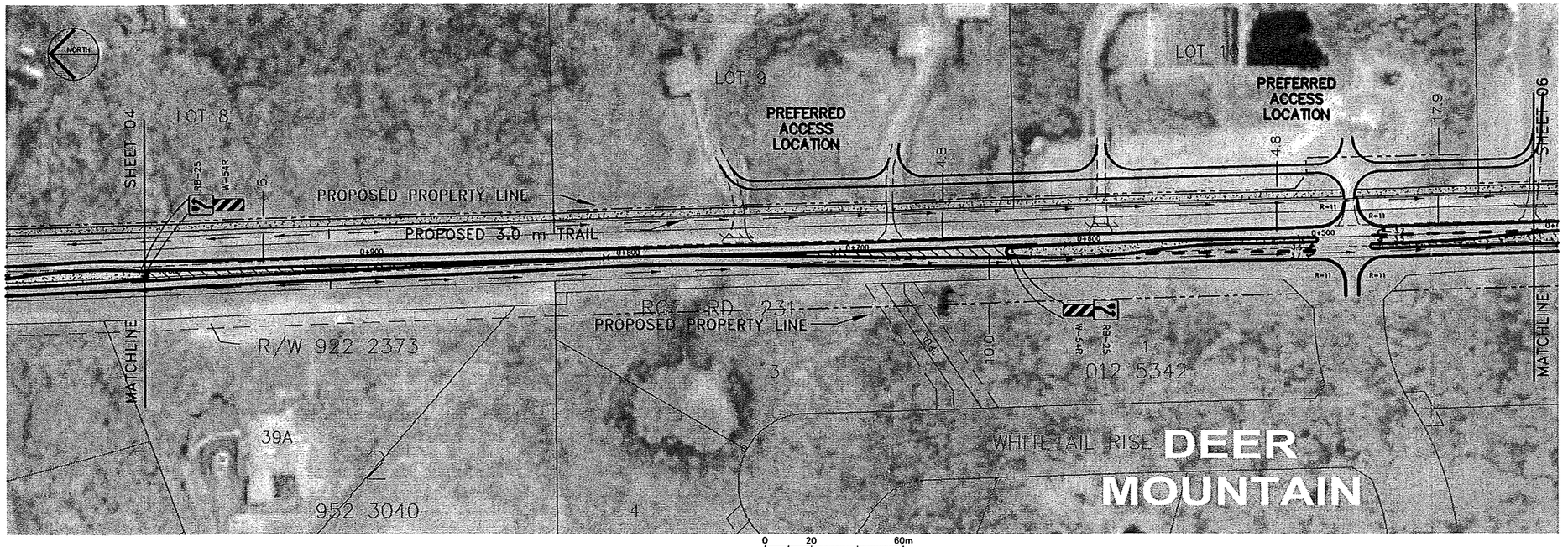
PERMIT

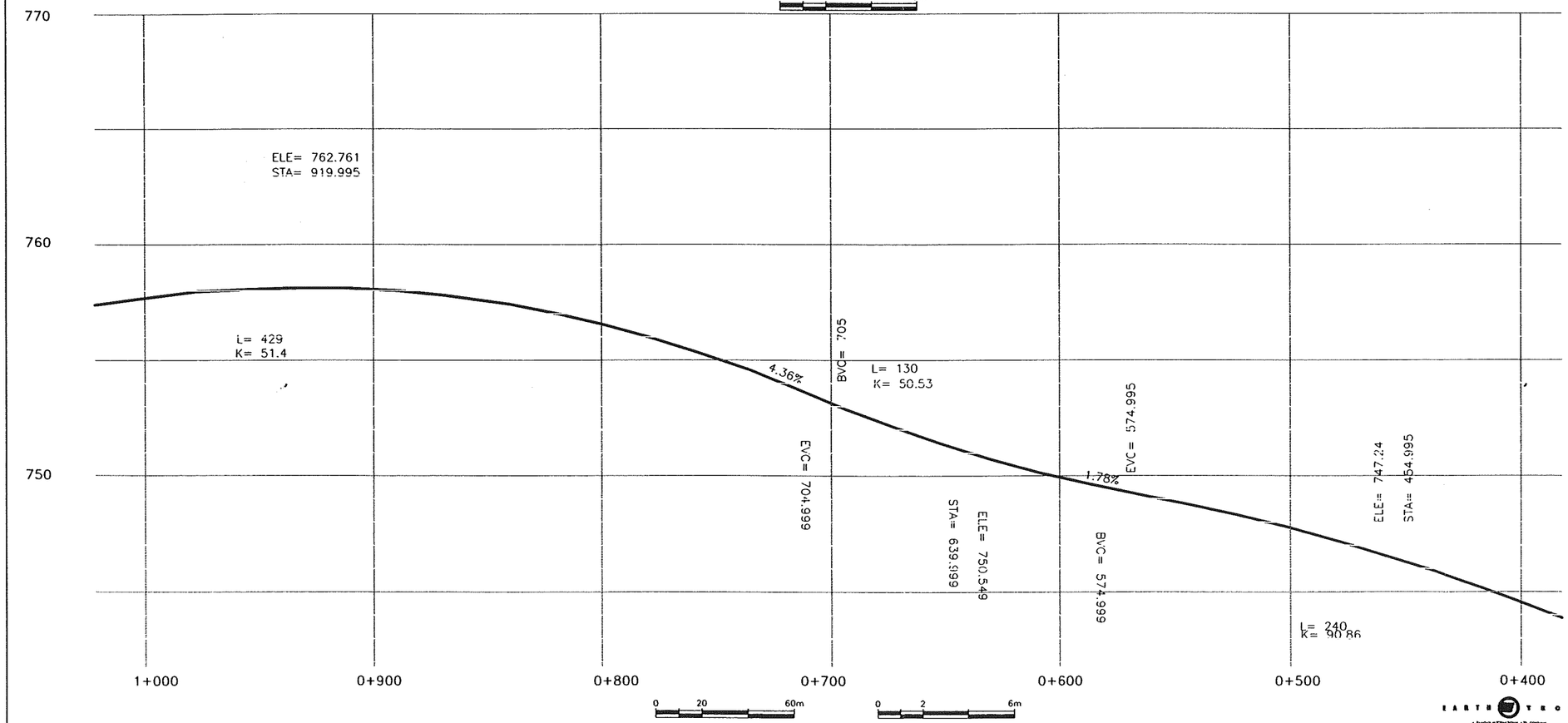
DATE 2003/MM/DD	
SCALE H= 1:1000 V= 1:100 PLOT DWG AT 1=1	
DRAWN by APL	

RANGE ROAD 231
FROM WYE ROAD TO
TWP. RD. 522
TITLE
STA. 1+600 TO
STA. 1+000

DRAWING NUMBER	REV.	SHEET
231 SHEET 04	A	4/6

EARTH TECH
A Tyco International LTD. Company





LEGEND

PROFILE

- EXISTING GROUND CL
- ASBUILT EAST DITCH
- ASBUILT WEST DITCH
- ASBUILT CENTERLINE

PLAN

- PROPERTY LINE
- FENCE
- NUL/GAS LINE
- TAU/POWER LINE
- AGT/TELEPHONE LINE
- EXISTING RIGHT DITCH
- EXISTING LEFT DITCH
- BACKSLOPE LIMITS
- HORIZONTAL BASELINE
- ORIG. TOPO FEATURES ie. ROAD , BLDG.
- TREE
- BUSH
- SLOUGH/WATER
- DIRECTION OF FLOW
- CULVERT
- PROPOSED PROPERTY LINE
- PROPOSED SIDEWALK

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No.	DATE	BY	ENG	SUBJECT

REVISIONS

Strathcona County
ENGINEERING & ENVIRONMENTAL PLANNING
2001 SHERWOOD DRIVE
SHERWOOD PARK, ALBERTA, T8A 3W7

JOB NUMBER	---
SURVEY, DATE & BOOK	
DRAWN	----
DESIGNED	---
CHECKED	---
APPROVED	---
APPROVED	---

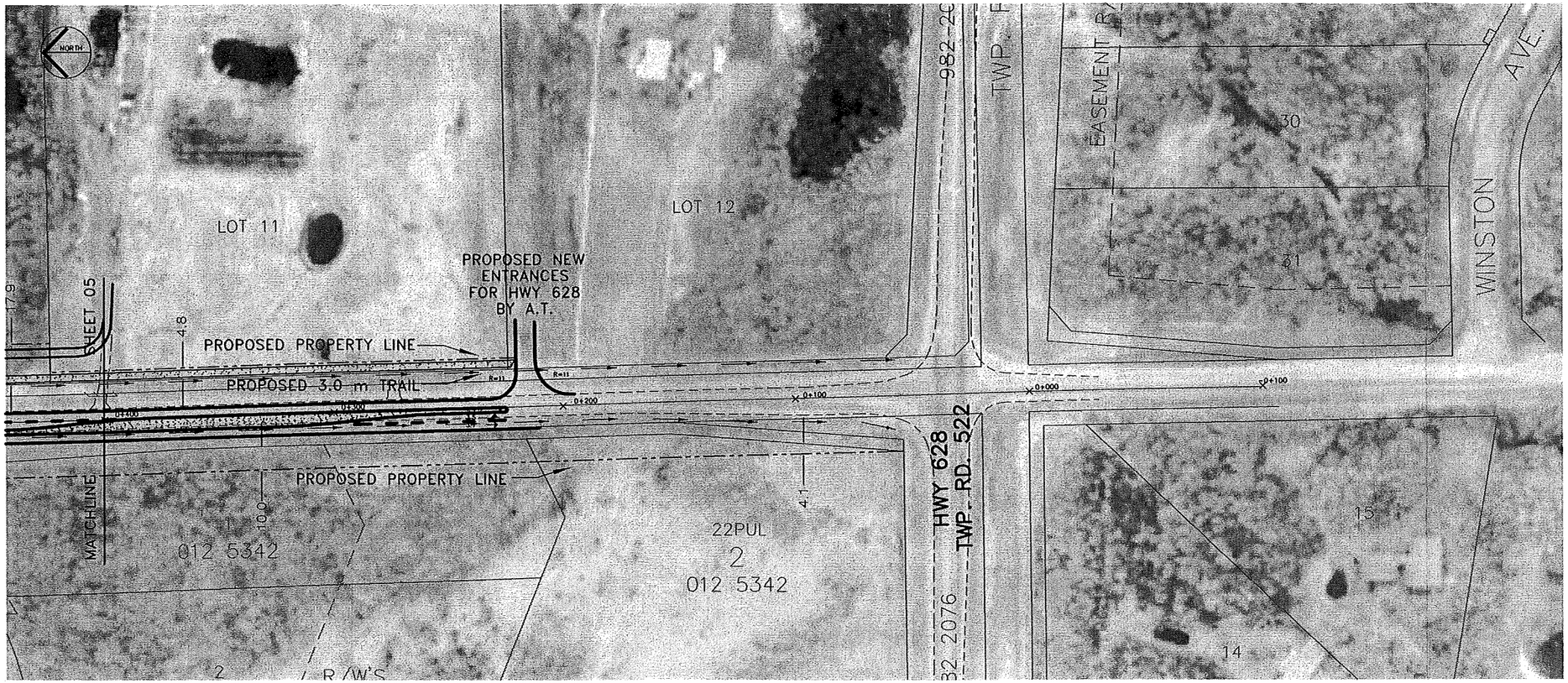
ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

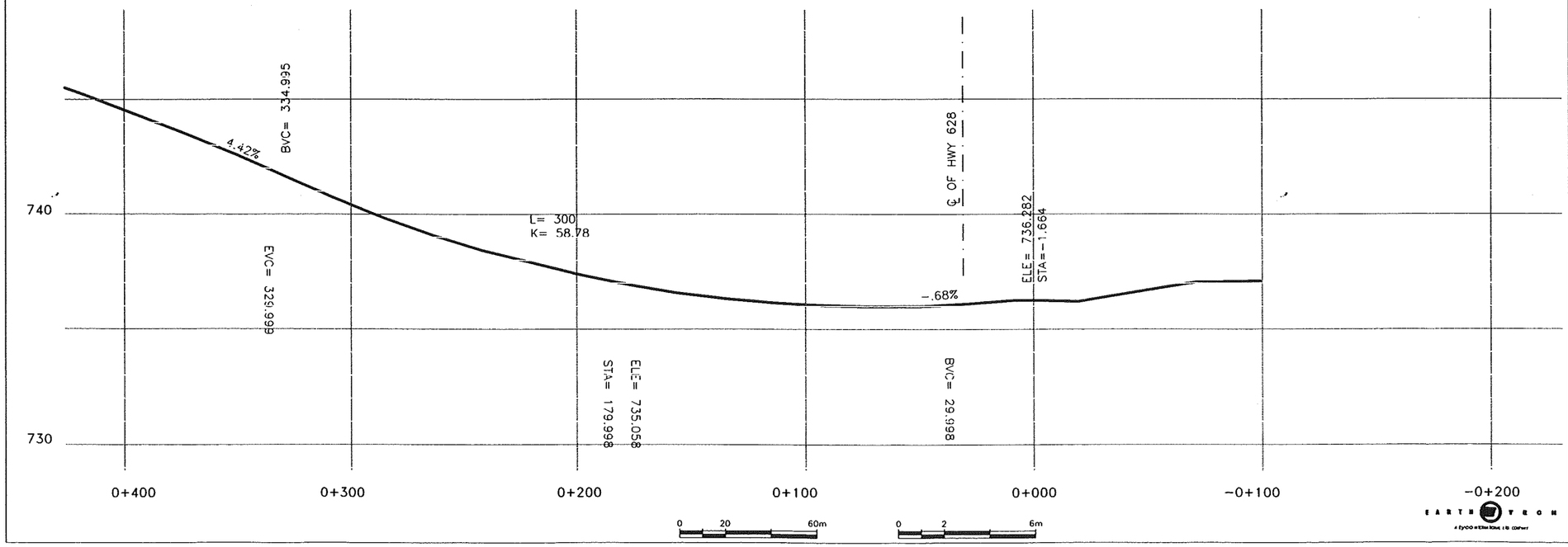
DATE 2003/MM/DD
SCALE H= 1:1000 V= 1:100 PLOT DWG AT 1=1
DRAWN by APL
PERMIT

RANGE ROAD 231
FROM WYE ROAD TO
TWP. RD. 522
TITLE
STA. 1+000 TO
STA. 0+400

DRAWING NUMBER	REV.	SHEET
231 SHEET 05	A	5/6

EARTH TECH





LEGEND

PROFILE

- EXISTING GROUND CL
- ASBUILT EAST DITCH
- ASBUILT WEST DITCH
- ASBUILT CENTERLINE

PLAN

- PROPERTY LINE
- FENCE
- NUL/GAS LINE
- TAU/POWER LINE
- AGT/TELEPHONE LINE
- EXISTING RIGHT DITCH
- EXISTING LEFT DITCH
- BACKSLOPE LIMITS
- HORIZONTAL BASELINE
- ORIG. TOPO FEATURES ie. ROAD , BLDG.
- TREE
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- CULVERT
- PROPOSED PROPERTY LINE
- PROPOSED SIDEWALK

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No.	DATE	BY	ENG	SUBJECT

REVISIONS

Strathcona County

ENGINEERING & ENVIRONMENTAL PLANNING
2001 SHERWOOD DRIVE
SHERWOOD PARK, ALBERTA, T8A 3W7

JOB NUMBER	---
SURVEY, DATE & BOOK	
DRAWN	----
DESIGNED	---
CHECKED	---
APPROVED	---
APPROVED	---

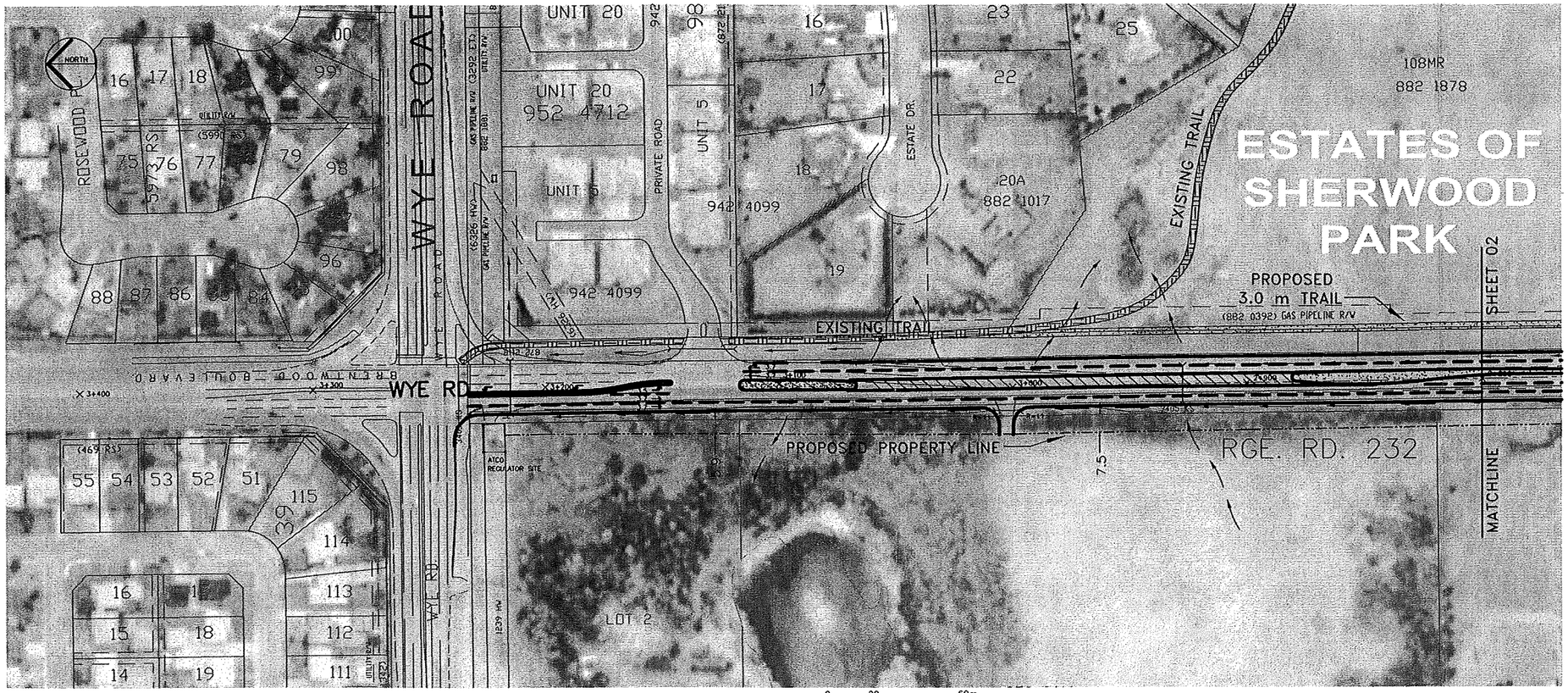
ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

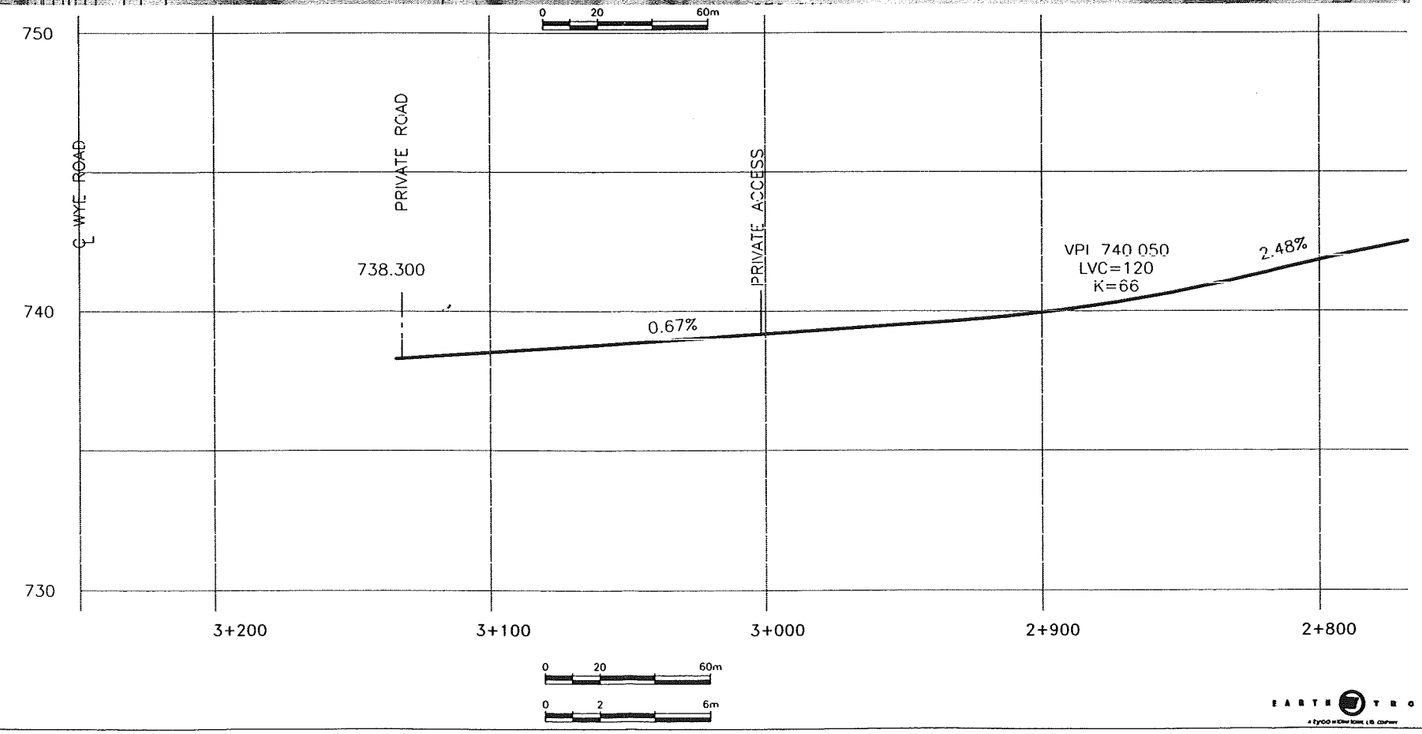
PERMIT

DATE 2003/MM/DD	
SCALE H= 1:1000 V= 1:100 PLOT DWG AT 1=1	
DRAWN by APL	

RANGE ROAD 231
FROM WYE ROAD TO
TWP. RD. 522
TITLE
STA. 0+400 TO
STA. -0+200

DRAWING NUMBER	REV.	SHEET
231 SHEET 06	A	6/6





LEGEND

PROFILE

- EXISTING GROUND CL
- ASBUILT EAST DITCH
- ASBUILT WEST DITCH
- ASBUILT CENTERLINE

PLAN

- PROPERTY LINE
- FENCE
- NUL/GAS LINE
- TAU/POWER LINE
- AGT/TELEPHONE LINE
- EXISTING RIGHT DITCH
- EXISTING LEFT DITCH
- BACKSLOPE LIMITS
- HORIZONTAL BASELINE
- ORIG. TOPO FEATURES ie. ROAD , BLDG.
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No.	DATE	BY	ENG	SUBJECT

REVISIONS

Strathcona County

ENGINEERING & ENVIRONMENTAL PLANNING
2001 SHERWOOD DRIVE
SHERWOOD PARK, ALBERTA, T8A 3W7

JOB NUMBER	---
SURVEY, DATE & BOOK	
DRAWN	----
DESIGNED	---
CHECKED	---
APPROVED	---
APPROVED	---

ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

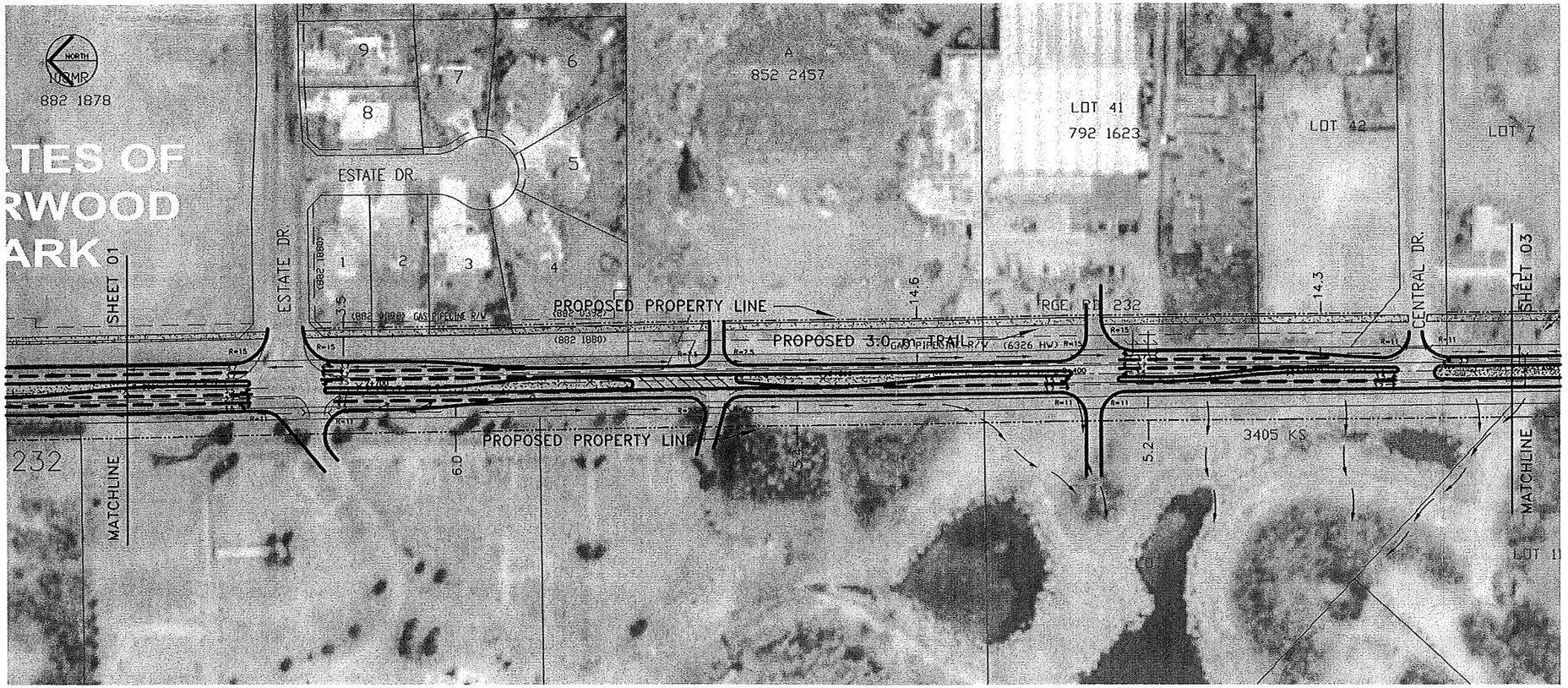
DATE 2003/MM/DD	PERMIT
SCALE H= 1:1000 V= 1:100 PLOT DWG AT 1=1	
DRAWN by APL	

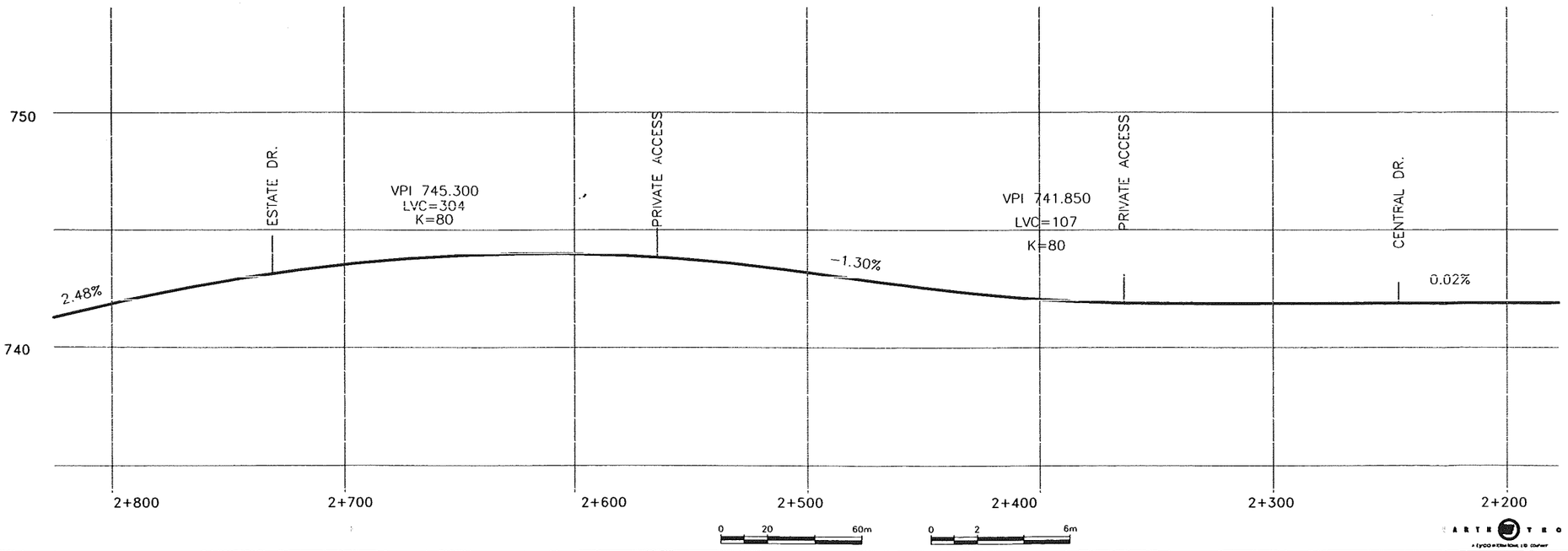
RANGE ROAD 232
FROM WYE ROAD TO TWP. RD. 522

STA. 3+200 TO
STA. 2+800

DRAWING NUMBER	REV.	SHEET
232 SHEET 01	A	1/6

EARTH TECH
A TYCO INTERNATIONAL LTD. COMPANY





LEGEND

PROFILE

- EXISTING GROUND CL
- ASBUILT EAST DITCH
- ASBUILT WEST DITCH
- ASBUILT CENTERLINE

PLAN

- PROPERTY LINE
- FENCE
- NUL/GAS LINE
- TAU/POWER LINE
- AGT/TELEPHONE LINE
- EXISTING RIGHT DITCH
- EXISTING LEFT DITCH
- BACKSLOPE LIMITS
- HORIZONTAL BASELINE
- ORIG. TOPO FEATURES ie. ROAD , BLDG.
- TREE
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No.	DATE	BY	ENG	SUBJECT

REVISIONS

Strathcona County

ENGINEERING & ENVIRONMENTAL PLANNING
2001 SHERWOOD DRIVE
SHERWOOD PARK, ALBERTA, T8A 3W7

JOB NUMBER	---
SURVEY, DATE & BOOK	
DRAWN	----
DESIGNED	---
CHECKED	---
APPROVED	---
APPROVED	---

ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

PERMIT

DATE 2003/MM/DD

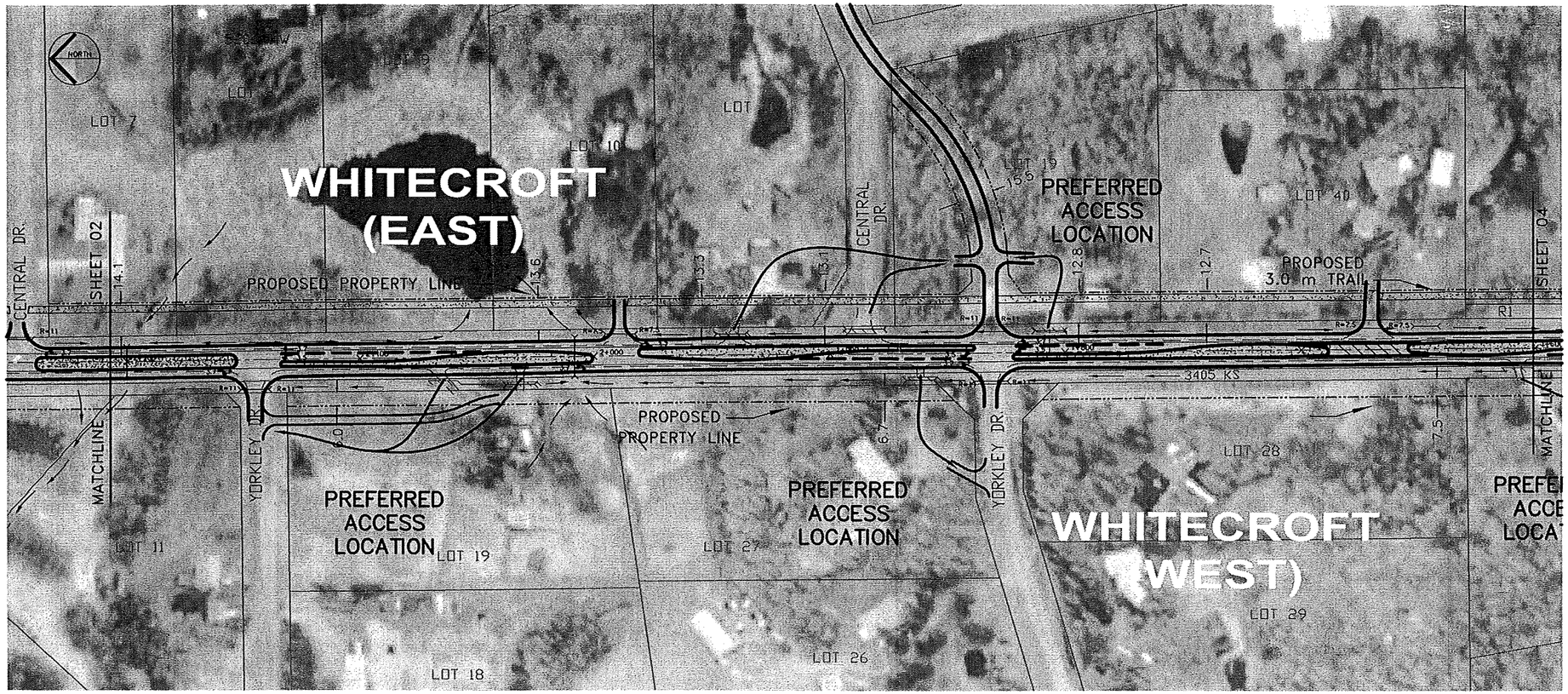
SCALE
H= 1:1000
V= 1:100
PLOT DWG AT 1=1

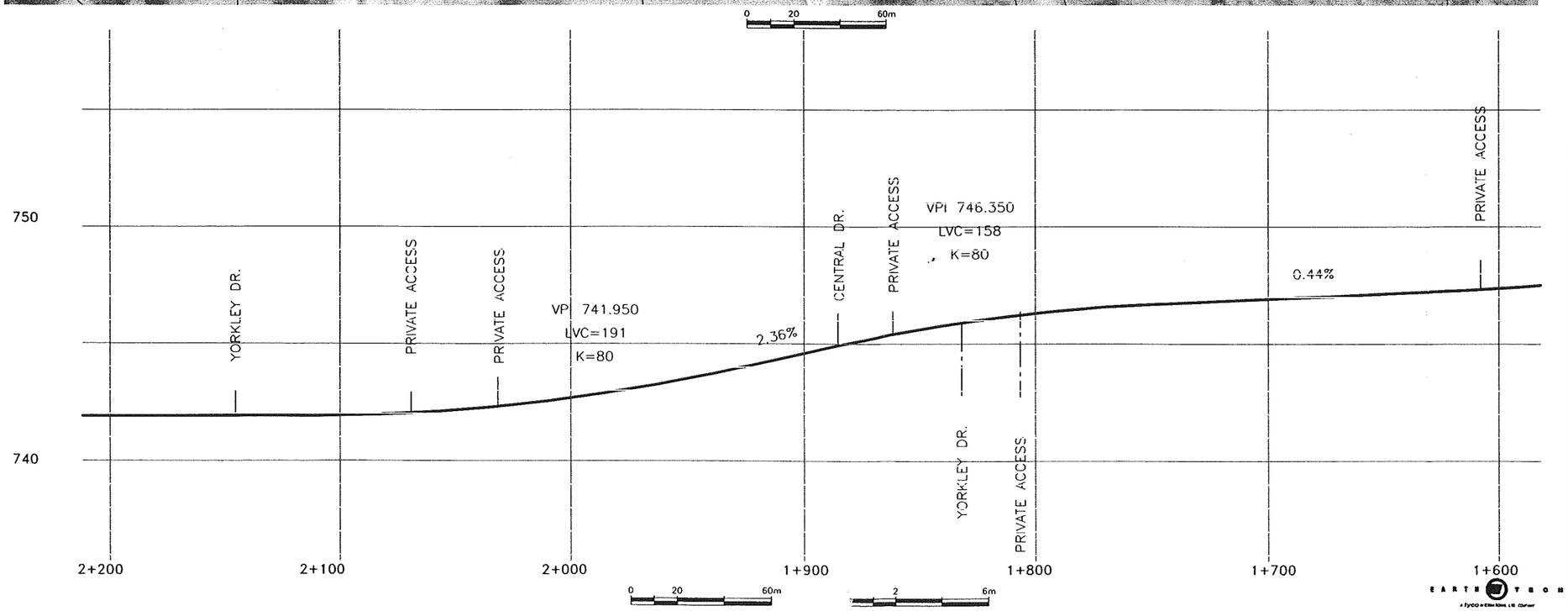
DRAWN by APL

RANGE ROAD 232
FROM WYE ROAD TO
TWP. RD. 522

STA. 2+800 TO
STA. 2+200

DRAWING NUMBER	REV.	SHEET
232 SHEET 02	A	2/6





LEGEND

PROFILE

- EXISTING GROUND CL
- ASBUILT EAST DITCH
- ASBUILT WEST DITCH
- ASBUILT CENTERLINE

PLAN

- PROPERTY LINE
- FENCE
- GAS LINE
- TAU/POWER LINE
- AGT/TELEPHONE LINE
- EXISTING RIGHT DITCH
- EXISTING LEFT DITCH
- BACKSLOPE LIMITS
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No.	DATE	BY	ENG	SUBJECT

REVISIONS

Strathcona County
ENGINEERING & ENVIRONMENTAL PLANNING
2001 SHERWOOD DRIVE
SHERWOOD PARK, ALBERTA, T8A 3W7

JOB NUMBER	---
SURVEY, DATE & BOOK	
DRAWN	----
DESIGNED	---
CHECKED	---
APPROVED	---
APPROVED	---

ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

PERMIT

DATE 2003/JAN/DD

SCALE H= 1:1000 V= 1:100 PLOT DWG AT 1=1

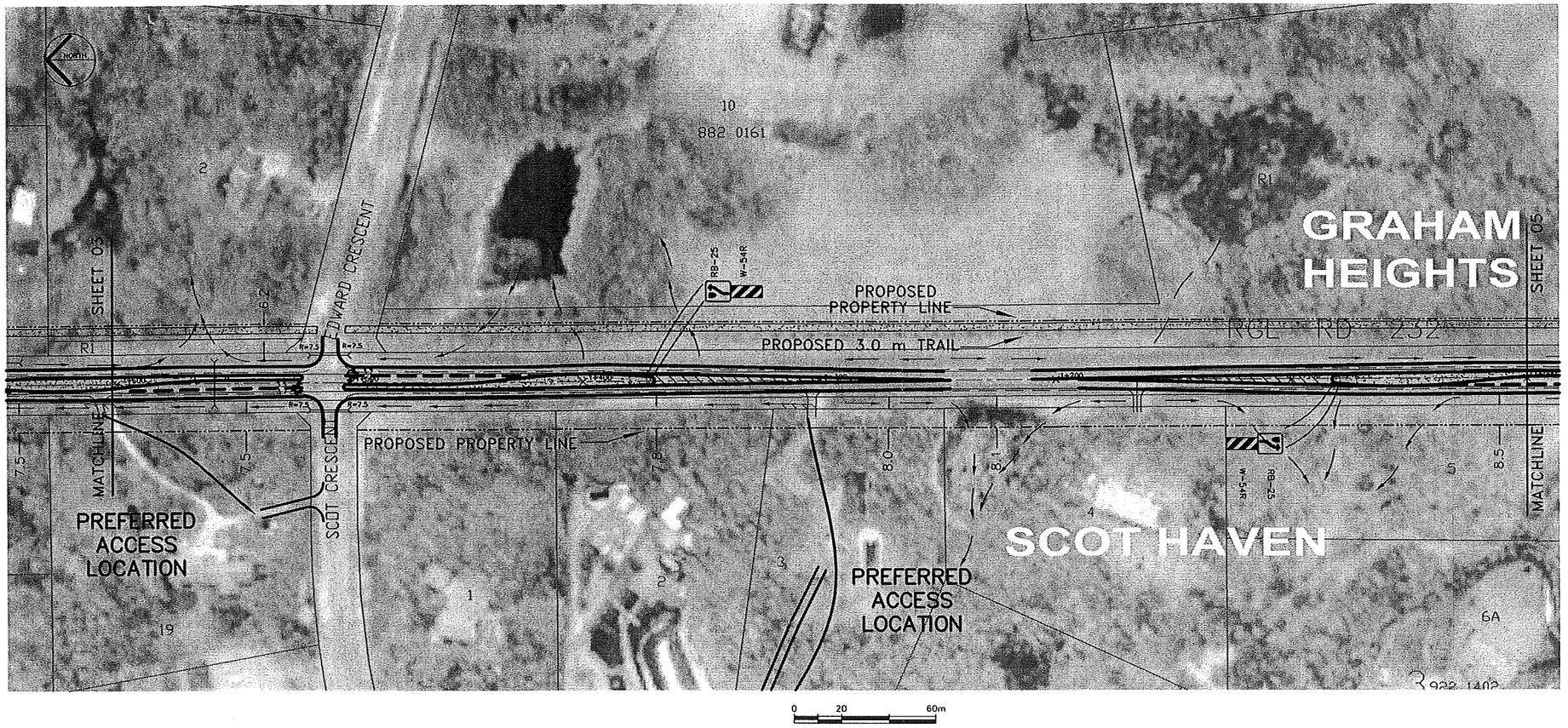
DRAWN by APL

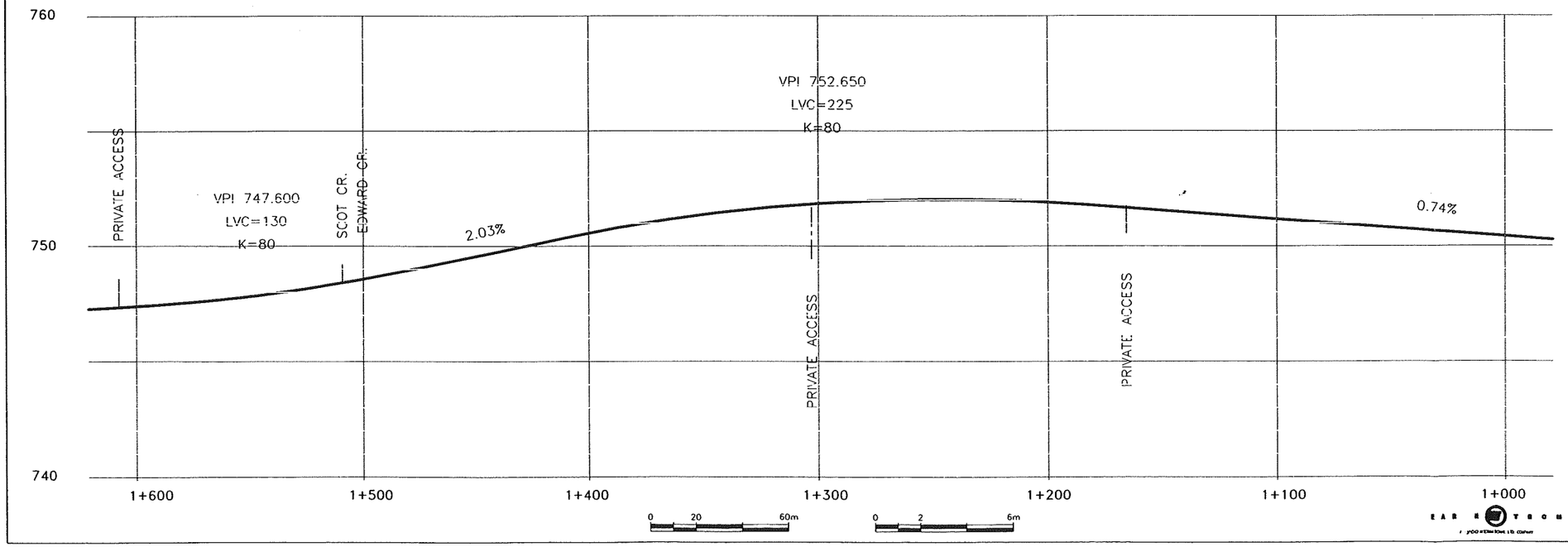
RANGE ROAD 232
FROM WYE ROAD TO
TWP. RD. 522

STA. 2+200 TO
STA. 1+600

DRAWING NUMBER	REV.	SHEET
232 SHEET 03	A	3/6

EARTH TECH
A Tyco International Ltd. Company





LEGEND

PROFILE

- EXISTING GROUND CL
- ASBUILT EAST DITCH
- ASBUILT WEST DITCH
- ASBUILT CENTERLINE

PLAN

- PROPERTY LINE
- FENCE
- GAS LINE
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No.	DATE	BY	ENG	SUBJECT

REVISIONS

Strathcona County

ENGINEERING & ENVIRONMENTAL PLANNING
2001 SHERWOOD DRIVE
SHERWOOD PARK, ALBERTA, T8A 3W7

JOB NUMBER	---
SURVEY, DATE & BOOK	
DRAWN	---
DESIGNED	---
CHECKED	---
APPROVED	---
APPROVED	---

ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

DATE 2003/MM/DD

SCALE
H= 1:1000
V= 1:100
PLOT DWG AT 1=1

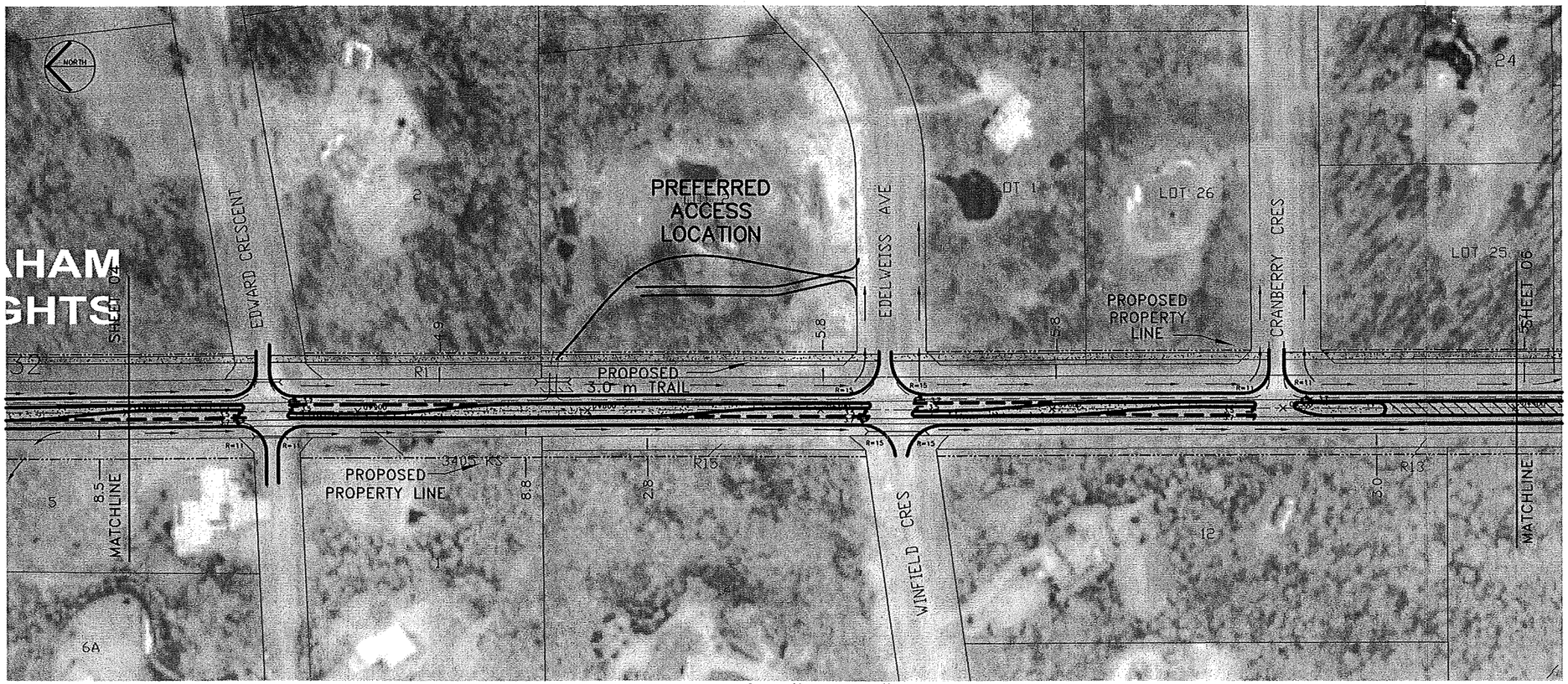
DRAWN by APL

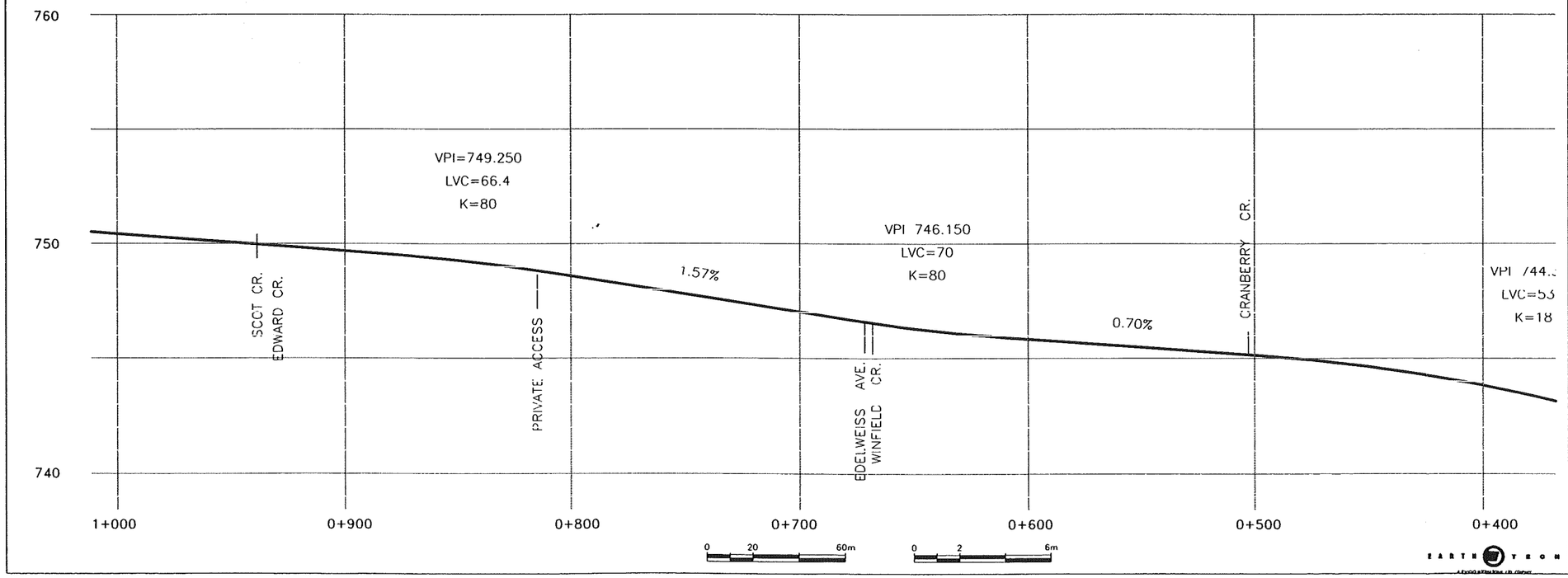
PERMIT

RANGE ROAD 232
FROM WYE ROAD TO
TWP. RD. 522

STA. 1+600 TO
STA. 1+000

DRAWING NUMBER	REV.	SHEET
232 SHEET 04	A	4/6





LEGEND

PROFILE

- EXISTING GROUND CL
- ASBUILT EAST DITCH
- ASBUILT WEST DITCH
- ASBUILT CENTERLINE

PLAN

- PROPERTY LINE
- FENCE
- GAS/GAS LINE
- TAU/POWER LINE
- AGT/TELEPHONE LINE
- EXISTING RIGHT DITCH
- EXISTING LEFT DITCH
- BACKSLOPE LIMITS
- HORIZONTAL BASELINE
- ORIG. TOPO FEATURES ie. ROAD , BLDG.
- TREE
- BUSH
- SLOUGH/WATER
- DIRECTION OF FLOW
- CULVERT
- PROPOSED PROPERTY LINE
- PROPOSED SIDEWALK

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6. ALL TRAFFIC CONTROL SIGNS TO BE REPLACED UPON COMPLETION OF THE ROAD RECONSTRUCTION PRIOR TO REOPENING THE ROAD TO THE PUBLIC.

No.	DATE	BY	ENG	SUBJECT

REVISIONS

Strathcona County

ENGINEERING & ENVIRONMENTAL PLANNING
2001 SHERWOOD DRIVE
SHERWOOD PARK, ALBERTA, T8A 3W7

JOB NUMBER	---
SURVEY, DATE & BOOK	
DRAWN	---
DESIGNED	---
CHECKED	---
APPROVED	---
APPROVED	---

ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

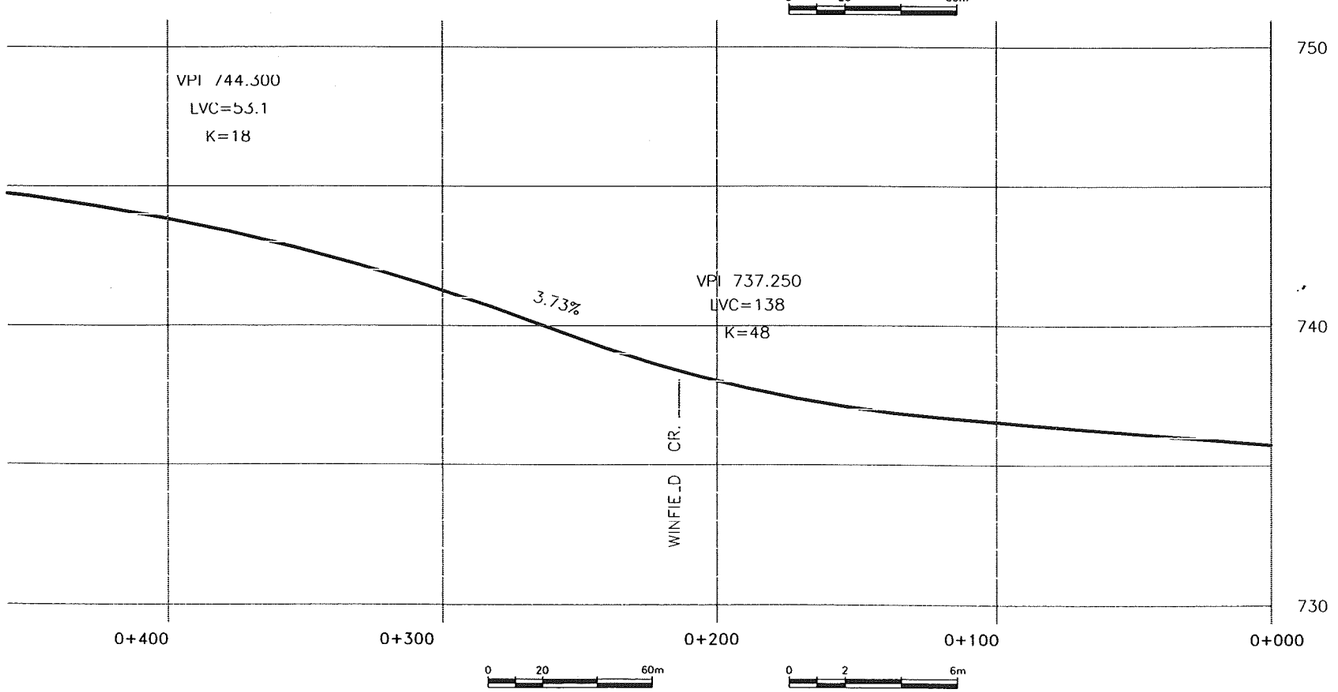
DATE 2003/MM/DD	PERMIT
SCALE H= 1:1000 V= 1:100 PLOT DWG AT 1=1	
DRAWN by APL	

RANGE ROAD 232
FROM WYE ROAD TO
TWP. RD. 522

STA. 1+000 TO
STA. 0+400

DRAWING NUMBER	REV.	SHEET
232 SHEET 05	A	5/6





LEGEND

PROFILE

- EXISTING GROUND CL
- ASBUILT EAST DITCH
- ASBUILT WEST DITCH
- ASBUILT CENTERLINE

PLAN

- PROPERTY LINE
- FENCE
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2001 SHERWOOD DRIVE
SHERWOOD PARK, ALBERTA, T8A 3W7

JOB NUMBER	---
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DRAWN	---
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APPROVED	---
APPROVED	---

ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

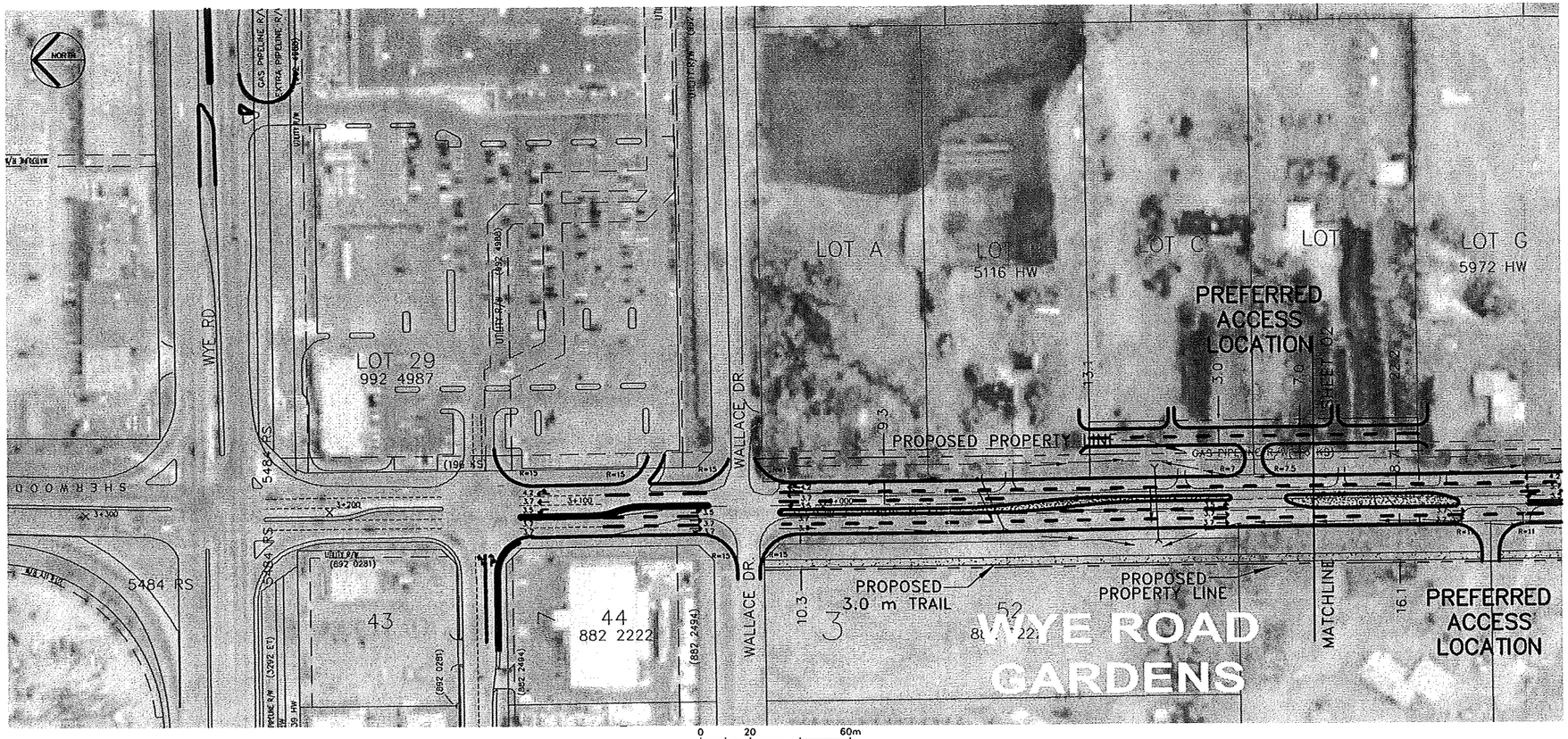
DATE 2003/MM/DD	PERMIT
SCALE H= 1:1000 V= 1:100 PLOT DWG AT 1=1	
DRAWN by APL	

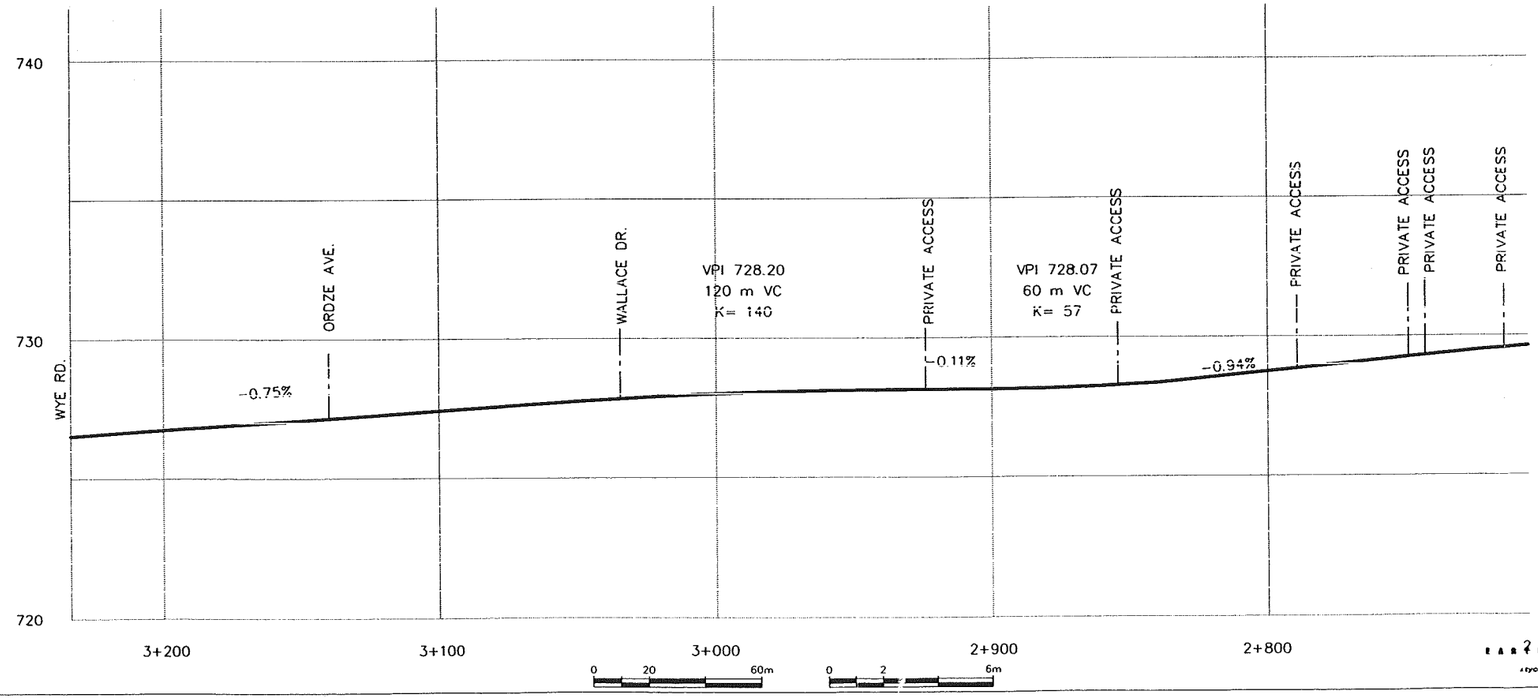
RANGE ROAD 232
FROM WYE ROAD TO
TWP. RD. 522

STA. 0+400 TO
STA. -0+200

DRAWING NUMBER	REV.	SHEET
232 SHEET 06	A	6/6

EARTH TECH





LEGEND

PROFILE

- EXISTING GROUND CL
- ASBUILT EAST DITCH
- ASBUILT WEST DITCH
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PLAN

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No.	DATE	BY	ENG	SUBJECT

REVISIONS

Strathcona County

ENGINEERING & ENVIRONMENTAL PLANNING
2001 SHERWOOD DRIVE
SHERWOOD PARK, ALBERTA, T8A 3W7

JOB NUMBER	---
SURVEY, DATE & BOOK	
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APPROVED	---
APPROVED	---

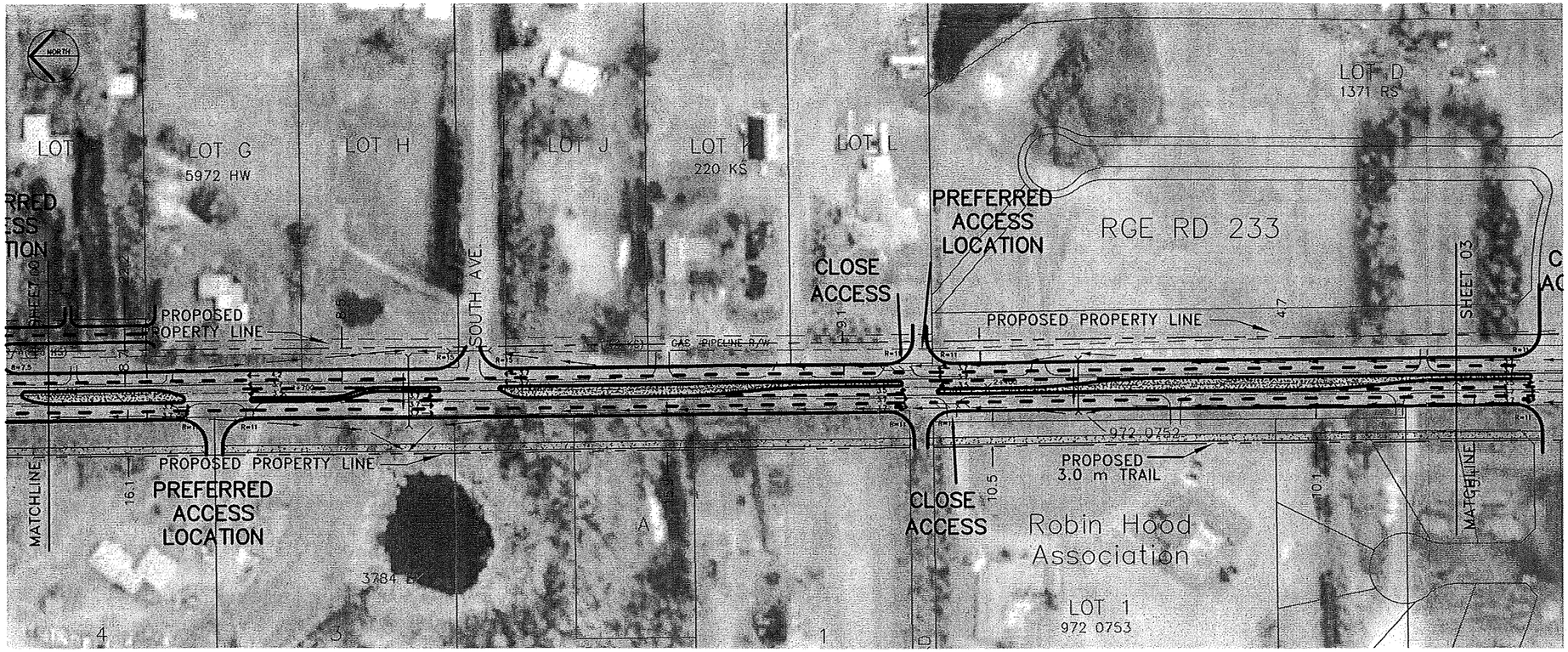
ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

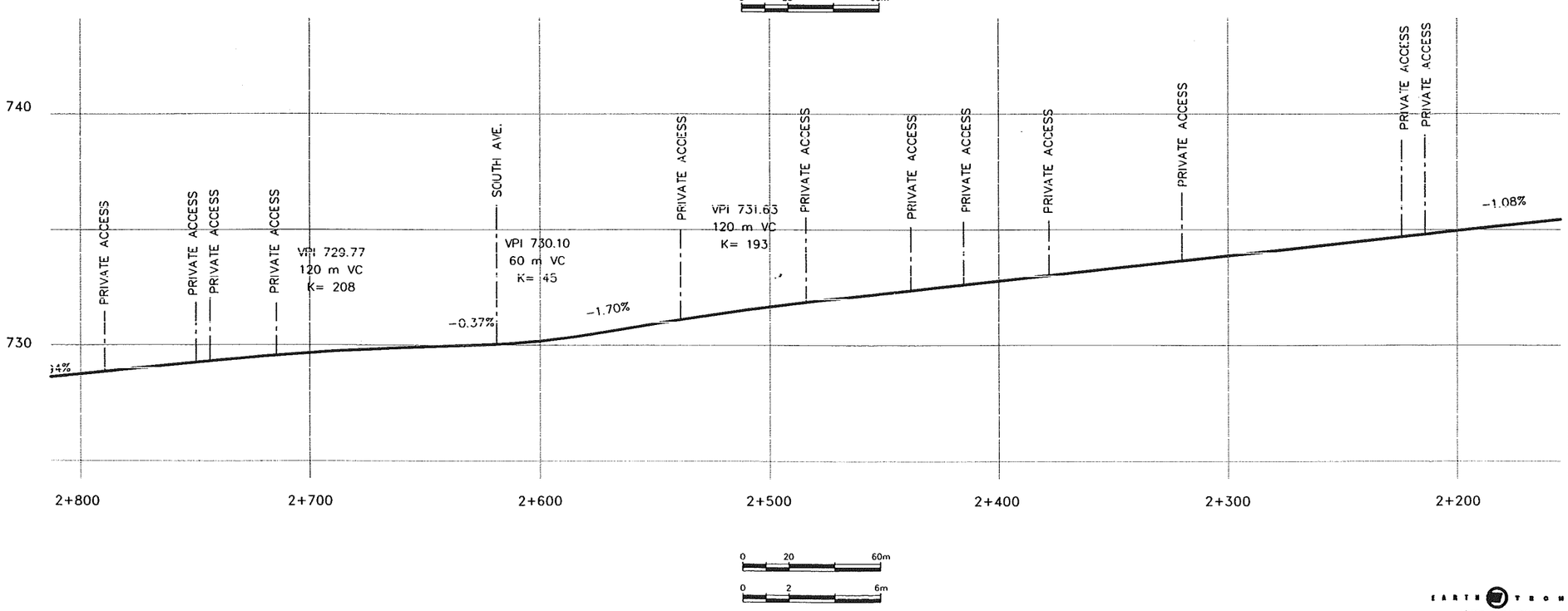
DATE 2003/MM/DD	PERMIT
SCALE H= 1:1000 V= 1:100 PLOT DWG AT 1=1	
DRAWN by APL	

RANGE ROAD 233
FROM WYE ROAD TO
TWP. RD. 522

STA. 3+200 TO
STA. 2+800

DRAWING NUMBER	REV.	SHEET
233 SHEET 01	A	1/6





LEGEND

PROFILE

- EXISTING GROUND CL
- ASBUILT EAST DITCH
- ASBUILT WEST DITCH
- ASBUILT CENTERLINE

PLAN

- PROPERTY LINE
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No.	DATE	BY	ENG	SUBJECT

REVISIONS

Strathcona County

ENGINEERING & ENVIRONMENTAL PLANNING
2001 SHERWOOD DRIVE
SHERWOOD PARK, ALBERTA, T8A 3W7

JOB NUMBER	---
SURVEY, DATE & BOOK	
DRAWN	----
DESIGNED	---
CHECKED	---
APPROVED	---
APPROVED	---

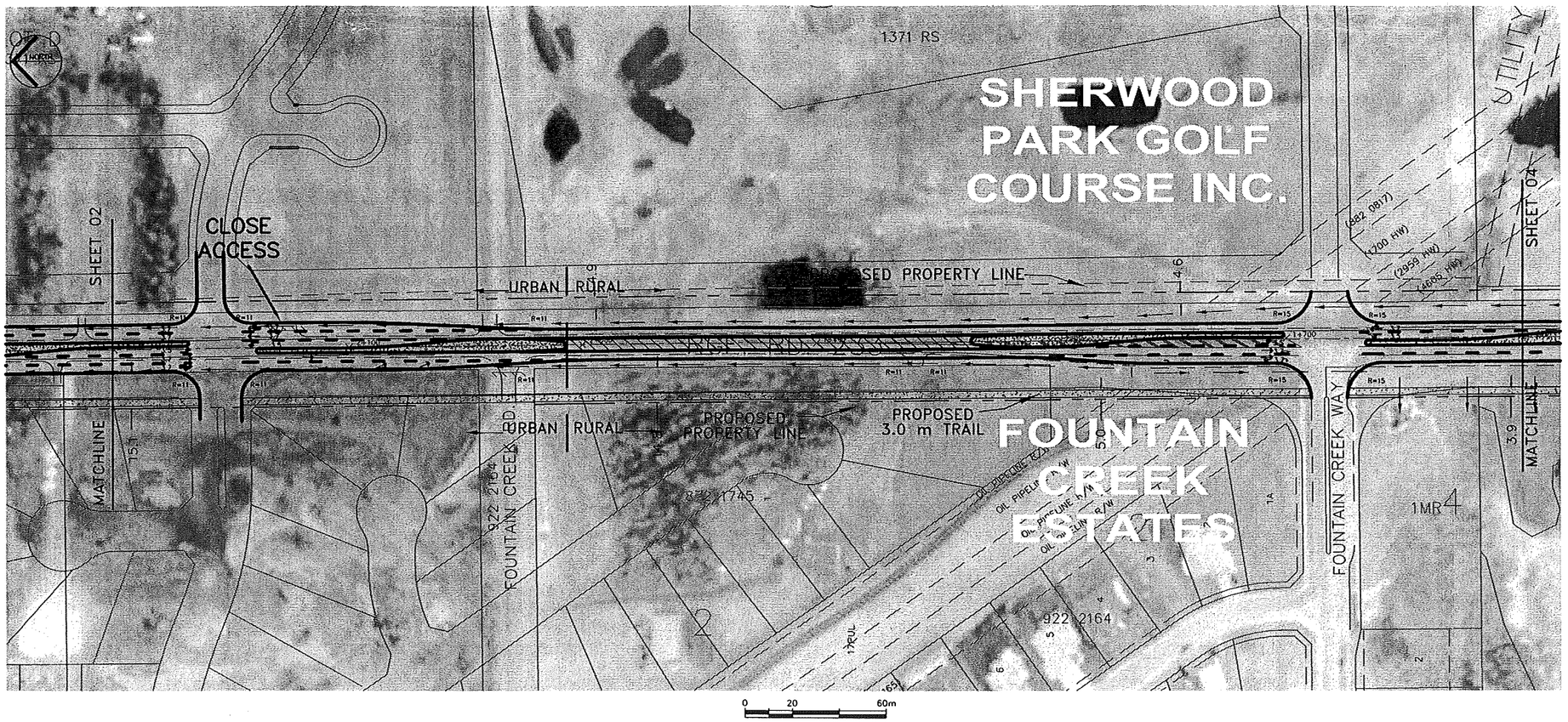
ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

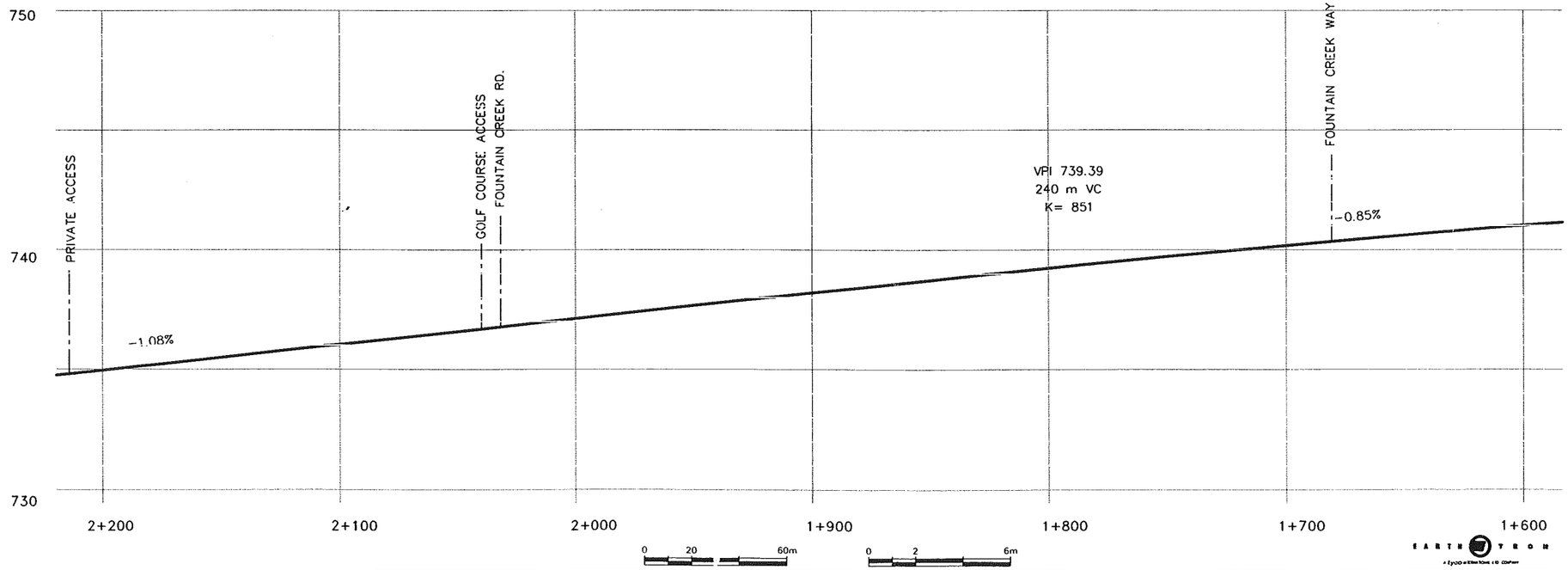
DATE 2003/MM/DD	PERMIT
SCALE H= 1:1000 V= 1:100 PLOT DWG AT 1=1	
DRAWN by APL	

RANGE ROAD 233
FROM WYE ROAD TO
TWP. RD. 522
TITLE
STA. 2+800 TO
STA. 2+200

DRAWING NUMBER	REV	SHEET
233 SHEET 02	A	2/6

EARTH TECH
A Tyco International Ltd. Company





LEGEND

PROFILE

- EXISTING GROUND CL
- ASBUILT EAST DITCH
- ASBUILT WEST DITCH
- ASBUILT CENTERLINE

PLAN

- PROPERTY LINE
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No.	DATE	BY	ENG	SUBJECT

REVISIONS

Strathcona County

ENGINEERING & ENVIRONMENTAL PLANNING
2001 SHERWOOD DRIVE
SHERWOOD PARK, ALBERTA, T8A 3W7

JOB NUMBER	
SURVEY, DATE & BOOK	
DRAWN	
DESIGNED	
CHECKED	
APPROVED	
APPROVED	

ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

DATE 2003/JUN/DD

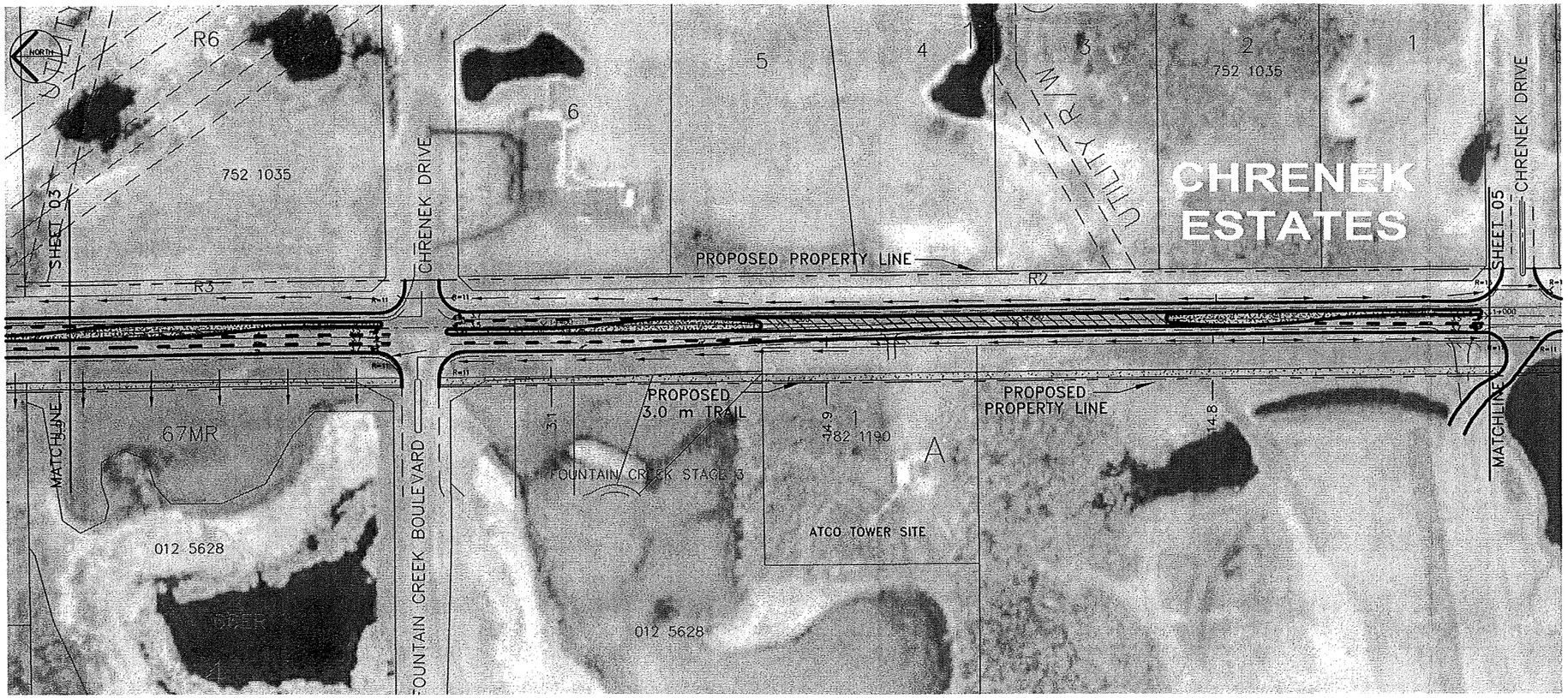
PERMIT

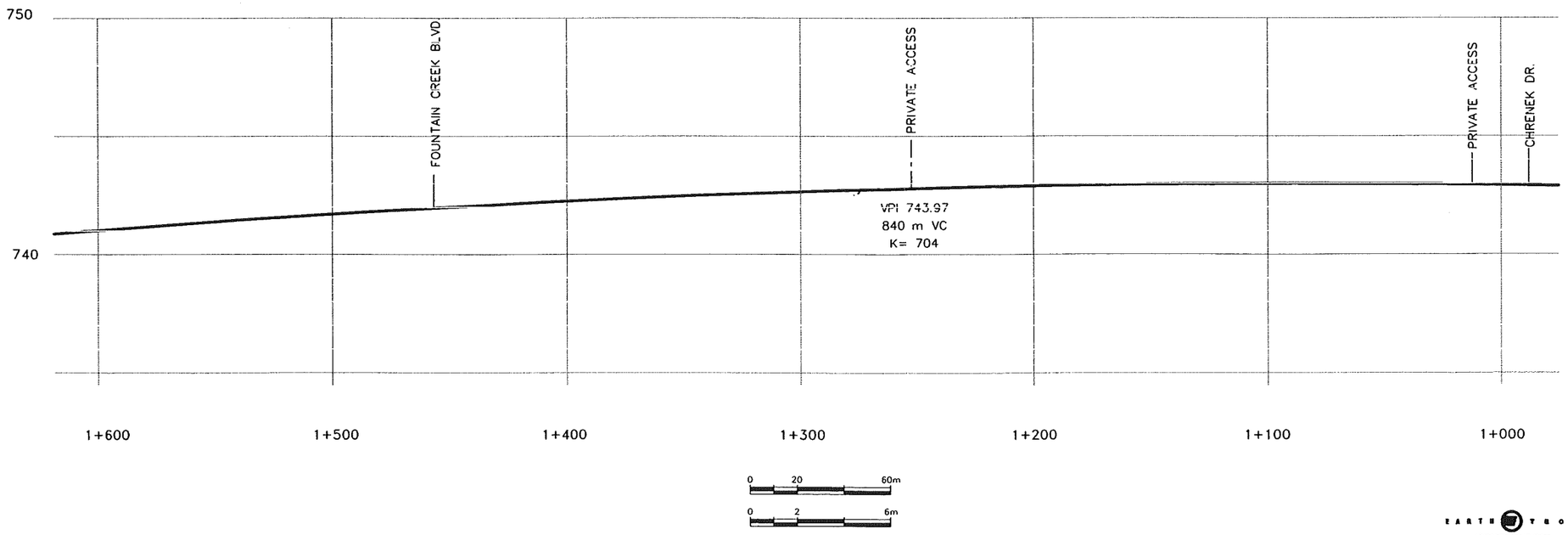
SCALE
H= 1:1000
V= 1:100
PLOT DWG AT 1=1

DRAWN by APL

RANGE ROAD 233
FROM WYE ROAD TO
TWP. RD. 522
TITLE
STA. 2+200 TO
STA. 1+600

DRAWING NUMBER	REV.	SHEET
233 SHEET 03	A	3/6





EARTH TECH
A TyrCO International Ltd. Company

LEGEND

PROFILE

- EXISTING GROUND CL
- ASBUILT EAST DITCH
- ASBUILT WEST DITCH
- ASBUILT CENTERLINE

PLAN

- PROPERTY LINE
- FENCE
- GAS LINE
- TAU/POWER LINE
- AGT/TELEPHONE LINE
- EXISTING RIGHT DITCH
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No.	DATE	BY	ENG	SUBJECT

REVISIONS

Strathcona County
ENGINEERING & ENVIRONMENTAL PLANNING
2001 SHERWOOD DRIVE
SHERWOOD PARK, ALBERTA, T8A 3W7

JOB NUMBER	---
SURVEY, DATE & BOOK	
DRAWN	---
DESIGNED	---
CHECKED	---
APPROVED	---
APPROVED	---

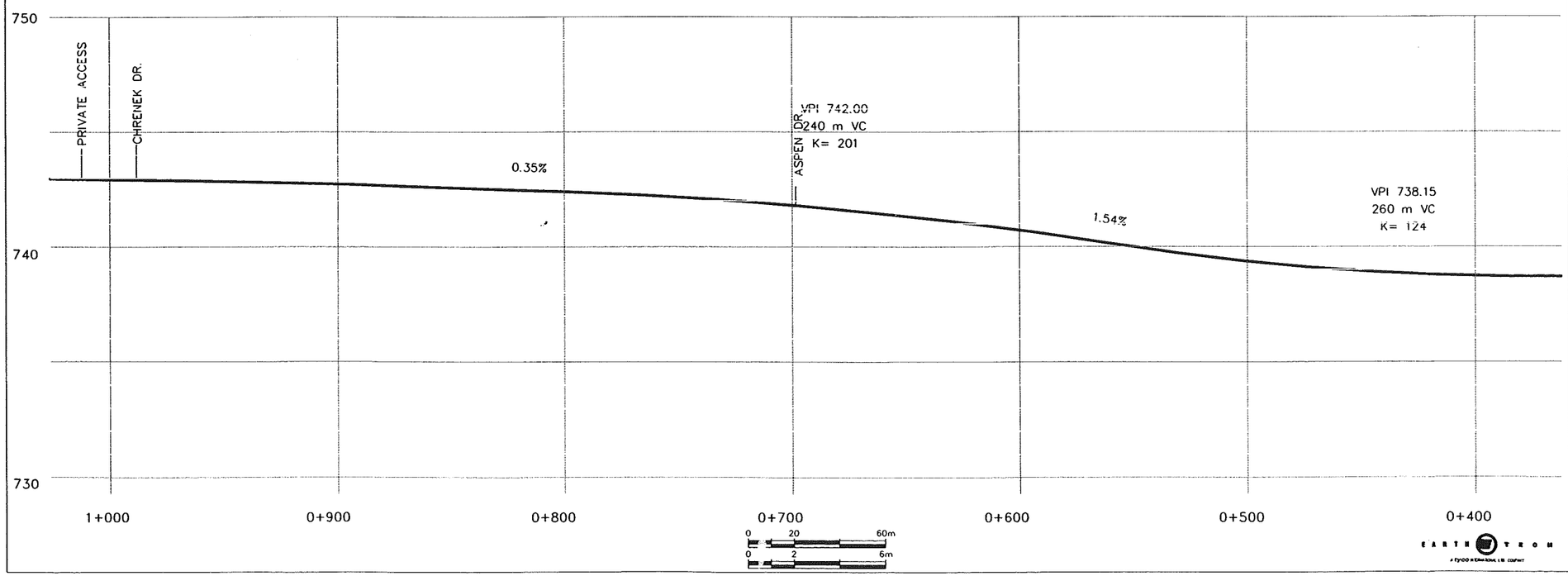
ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST | PERMIT

DATE 2003/mm/DD
SCALE H= 1:1000 V= 1:100 PLOT DWG AT 1=1
DRAWN by APL

RANGE ROAD 233
FROM WYE ROAD TO
TWP. RD. 522
TITLE
STA. 1+600 TO
STA. 1+000

DRAWING NUMBER	REV.	SHEET
233 SHEET 04	A	4/6





LEGEND

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PERMIT

DATE 2003/MM/DD

SCALE
H= 1:1000
V= 1:100
PLOT DWG AT 1=1

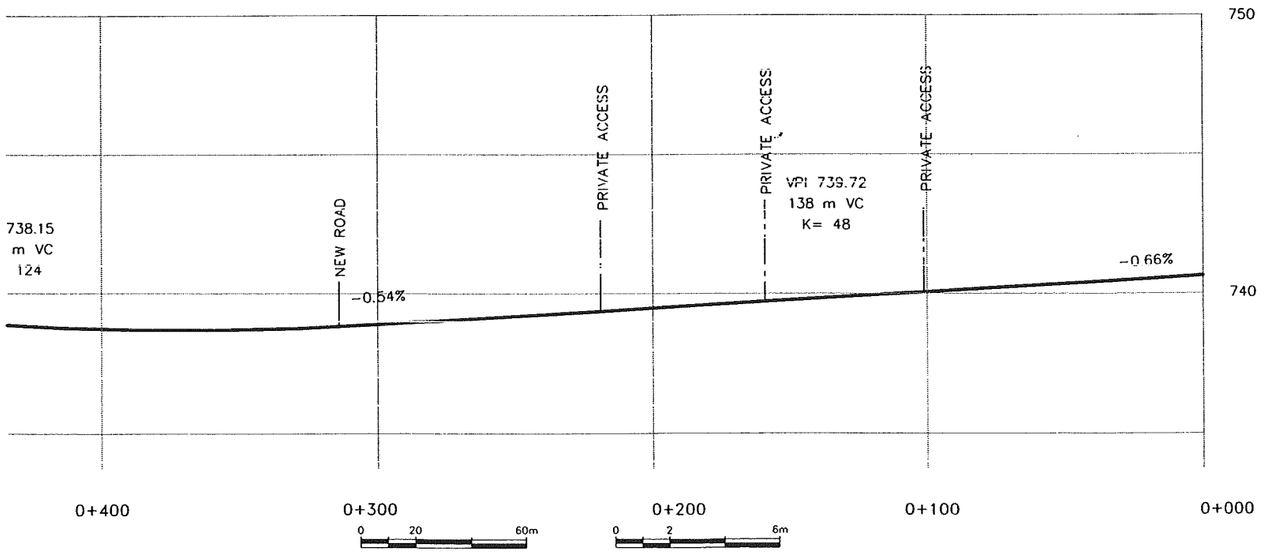
DRAWN by APL

RANGE ROAD 233
FROM WYE ROAD TO
TWP. RD. 522
TITLE
STA. 1+000 TO
STA. 0+400

DRAWING NUMBER	REV.	SHEET
233 SHEET 15	A	5/6

EARTH TECH
A TYCO INTERNATIONAL LTD COMPANY





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ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

DATE 2003/MM/DD

SCALE H= 1:1000 V= 1:100 PLOT DWG AT 1=1

DRAWN by APL

PERMIT

RANGE ROAD 233
FROM WYE ROAD TO
TWP. RD. 522
TITLE
STA. 0+400 TO
STA. -0+200

DRAWING NUMBER	REV.	SHEET
233 SHEET 06	A	6/6

EARTH TECH
A Tyco International Ltd. Company

APPENDIX I

RIGHT OF WAY REQUIREMENT

Right of Way
Range Road 231

Station	West Side Area (m^2)	Plan	Block	Lot	Name	Land Cost/m^2 $9.88
2000	4,045.18	SE23 52-23-4				$39,982.56
1100	37.38			42		$369.46
750	1,418.03			3		$14,015.81
600	1,356.57			1		$13,408.34
400	1,392.89			1		$13,767.32
275	881.71					$8,714.82
150	1,104.09	22PUL		2		$10,912.83
SUB-TOTAL	***10,235.85***					$101,171.14

Station	East Side Area (m^2)	Plan	Block	Lot	Name	Land Cost/m^2 $9.88
1500	2,774.06			1		$27,418.81
1300	1,093.80			2		$10,811.12
1000	1,976.36			8		$19,534.34
750	966.57			9		$9,553.58
500	1,928.18			10		$19,058.13
350	969.15			11		$9,579.08
SUB-TOTAL	9,708.12					95,955.06
TOTAL	**19,943.97**					**197,126.20**

Right of Way
Range Road 232

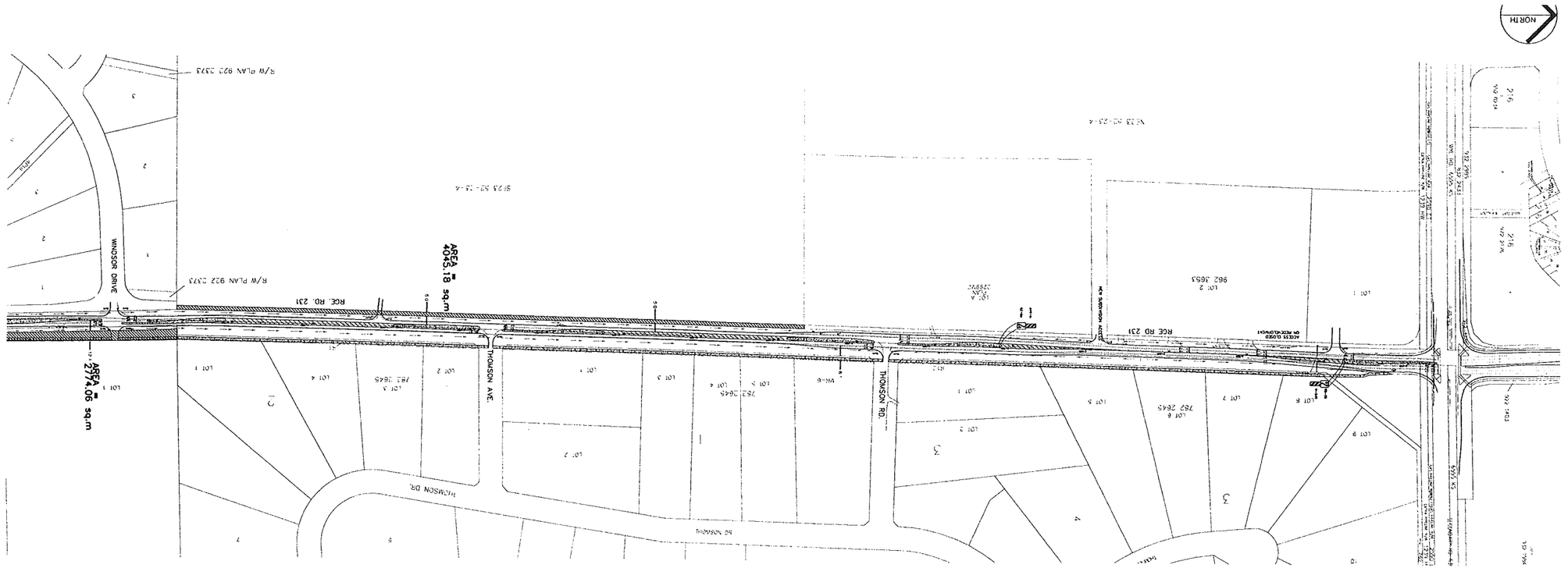
Station	West Side Area (m^2)	Plan	Block	Lot	Name	Land Cost/m^2 $9.88
3200	530.36	2				$5,242.08
3000	2,000.42	1 /872 0616				$19,772.15
2600	2,360.70	T 3675TR				$23,333.16
2550	1,205.52	P				$11,915.36
2180	316.37	11				$3,127.00
2050	862.94	19				$8,529.30
1920	933.03	27				$9,222.07
1750	1,273.89	28				$12,591.13
1550	826.15	19				$8,165.67
1475	642.42	1				$6,349.68
1375	724.89	2				$7,164.81
1275	586.82	3				$5,800.13
1200	968.10	4				$9,568.70
1050	1,524.18	5				$15,065.00
875	909.16	1				$8,986.14
750	397.08	14				$3,924.74
550	655.12	12				$6,475.21
300	616.81	762 0115				$6,096.55
150	563.98	1				$5,574.38
SUB-TOTAL	***17,897.94***					$176,903.24

Station	East Side Area (m^2)	Plan	Block	Lot	Name	Land Cost/m^2 $9.88
2710	79.95	1				$790.23
2690	90.78	2				$897.27
2650	132.53	3				$1,309.93
2600	200.47	4				$1,981.45
2500	1,263.48	A/852 2457				$12,488.24
2400	998.05	41 / 792 1623				$9,864.73
2300	396.40	42				$3,918.02
2200	776.74	7				$7,677.30
2150	894.62	8				$8,842.42
2100	986.43	9				$9,749.87
2020	950.34	10				$9,393.16
1950	925.36	11				$9,146.26
1850	3,016.59	19				$29,815.98
1700	1,630.86	40				$16,119.42
1550	676.45	2				$6,686.03
1050	6238.56	R1				$61,661.93
875	510.14	2				$5,042.22
750	788.66	2				$7,795.12
625	390.04	1				$3,855.16
550	363.62	26				$3,594.02
450	558.25	25				$5,517.74
300	814.21	B				$8,047.65
175	629.93	1A				$6,226.23
80	590.61	2A				$5,837.59
SUB-TOTAL	23,903.07					236,257.94
TOTAL	**41,801.01**					**413,161.18**

Right of Way
Range Road 233

Station	West Side Area (m^2)	Plan	Block	Lot	Owner	Land Cost/m^2 $9.88
2950	1,987.33	882 2222	3	52	Angus Henry Thompsor	$19,642.77
2800	1,637.99	3784BK	4		Marian E McBain	$16,189.89
2700	1,652.09	3784BK	3		Richard A / Joyce R McBair	$16,329.26
2600	824.49	3784BK	2		John Welgan	$8,149.26
2550	813.23	3784BK	A		John Welgan	$8,037.97
2500	1,462.97	3784BK	1		John Welgan	$14,460.00
2350	1,514.96	9720753		1	Robin Hood Association For the Handicappe	$14,973.86
2250	561.35	4561TR		A	Strathcona County	$5,548.38
2150	2,673.95	SE 21-23-4				$26,429.32
1900	3,315.24	8721745	2	1	Fountain Creek Estates Ltd.	$32,767.83
1750	292.03	OilPipeLineR/W				$2,886.42
1650	91.83	9222164	4	1MR	The County of Strathcona No. 2(	$907.65
1550	444.55	125628	4	67MR	Strathcona County	$4,393.93
1450	38.03	?012 5628		B	Fountain Creek Estates Ltd.	$375.89
1425	78.74	?012 5628		B	Fountain Creek Estates Ltd.	$778.27
1375	117.78	?012 5628		B	Fountain Creek Estates Ltd.	$1,164.14
1325	202.27	?012 5628		B	Fountain Creek Estates Ltd.	$1,999.24
1275	1,361.67	7821190	A	1	Atco Gas and Pipelines Ltd	$13,458.75
1000	5,921.70	782 0876	B		Prem P & Saroj Singhmar	$58,530.08
800	512.30	7620166	1	15	Leonard S & Joanne Yaniw	$5,063.57
725	275.75	7620166	2	16	Lawrence P & Kathleen H Leonarc	$2,725.51
600	1,089.64	7620166	2	16	Lawrence P & Kathleen H Leonarc	$10,770.00
550	222.75	7620166	2	17	Gaylord W & Barbara L Carlsor	$2,201.66
475	695.68	7620166	2	17	Gaylord W & Barbara L Carlsor	$6,876.10
415	75.75	124011	3	1	Ansar & Ishrat Qureshi	$748.71
350	460.51	124011	3	1	Ansar & Ishrat Qureshi	$4,551.68
SUB-TOTAL	***28,324.58***					$279,960.15

Station	East Side Area (m^2)	Plan	Block	Lot	Owner	Land Cost/m^2 $9.88
3000	613.57	5116HW		A	Michael & Wasylena Scohatsky	$6,064.53
2950	607.29	5116HW		B	Michael & Wasylena Scohatsky	$6,002.45
2875	1,473.90	5116HW		C	Dion J & Tracy J Whittle	$14,568.03
2800	1,474.08	5972HW		F	Rajesh & Mirjala Chand	$14,569.81
2750	573.94	5972HW		G	Andrew Douglas & Marjorie Delta Watsor	$5,672.82
2675	571.93	5972HW		H	Murray & Susan Woods	$5,652.96
2600	534.59	220KS		J	Janet Sterling	$5,283.89
2525	544.74	220KS		K	Arthur Roger Louis Yates	$5,384.21
2450	588.21	220KS		L	Ted Elsasser	$5,813.87
2200	1,697.35	1371 RS		D	404585 Alberta Ltd	$16,776.61
1900	1,491.65	1371 RS		C	Sherwood Park Golf Courses Inc	$14,743.47
1700	504.18				Utility ROW	$4,983.32
775	552.24	8120815	1	1MR	The County of Strathcona No. 2(	$5,458.34
100	742.25	6198HW		A	Blueberry Ridge Management Corporatior	$7,336.40
SUB-TOTAL	11,969.92					118,310.69
TOTAL	**40,294.50**					**398,270.84**



ASBUILT EAST DITCH
ASBUILT WEST DITCH
ASBUILT CENTERLINE

PLAN

PROPERTY LINE
FENCE
NUL/GAS LINE
TAU/POWER LINE
AGT/TELEPHONE LINE
EXISTING RIGHT DITCH
EXISTING LEFT DITCH
BACKSLOPE LIMITS
HORIZONTAL BASELINE
ORIG. TOPO FEATURES ie. ROAD , BLDG.
TREE
BUSH
SLOUGH/WATER
DIRECTION OF FLOW
CULVERT
PROPOSED PROPERTY LINE
PROPOSED SIDEWALK

NOTES:

1. MINIMUM PRIVATE APPROACH RADIUS 6.0m, MINIMUM ROADWAY INTERSECTION OR COMMERCIAL RADIUS [illegible] UNLESS OTHERWISE SPECIFIED.
2. ALL UTILITIES SHOWN ARE REPRESENTATIVE ONLY AND MUST BE LOCATED IN FIELD BY THE PROPER AUTHORITIES PRIOR TO CONSTRUCTION COMMENCEMENT.
3. ALL REPLACEMENT CULVERTS TO BE CMP, MIN 450A FOR PRIVATE APPROACHES, 600A FOR THROUGH GRADES UNLESS OTHERWISE NOTED. ALL CULVERTS TO BE LOCATED AT END OF RADIUS TO MINIMIZE REQUIRED LENGTH OF CULVERT.
4. MINIMUM WIDTH 6.5m FOR PRIVATE APPROACHES OR TAPERED TO MATCH EXISTING.
5. USE OF MUNICIPAL RESERVE LANDS MUST BE APPROVED BY STRATHCONA COUNTY COMMUNITY & ENVIRONMENTAL PLANNING, 404-8717.
6. ALL TRAFFIC CONTROL SIGNS TO BE REPLACED UPON COMPLETION OF THE ROAD RECONSTRUCTION PRIOR TO REOPENING THE ROAD TO THE PUBLIC.

No.	DATE	BY	ENG	SUBJECT

REVISIONS

Strathcona County
ENGINEERING & ENVIRONMENTAL PLANNING
2001 SHERWOOD DRIVE
SHERWOOD PARK, ALBERTA, T8A 3A1

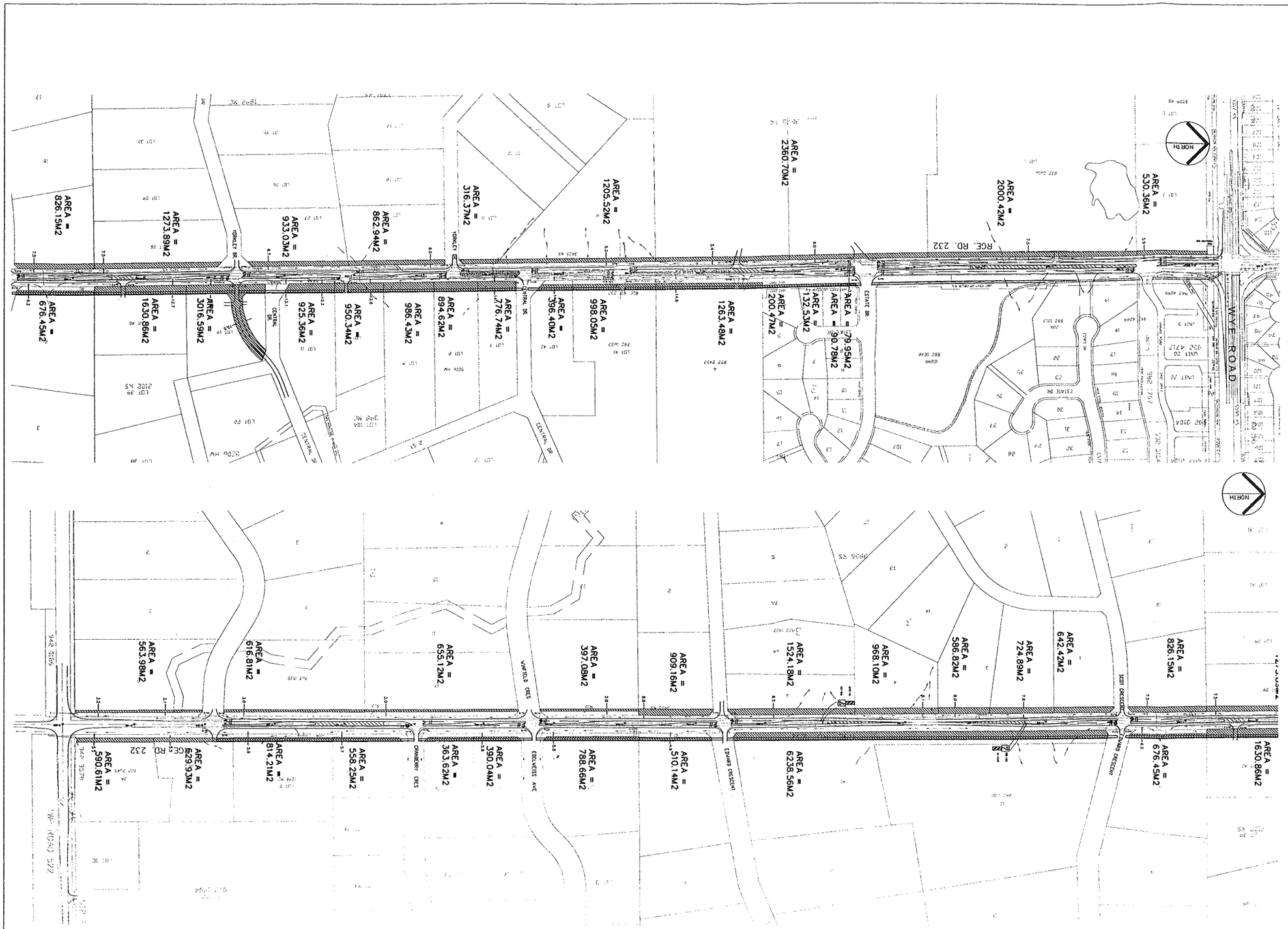
JOB NUMBER	---
SURVEY, DATE & BOOK	
DRAWN	----
DESIGNED	---
CHECKED	---
APPROVED	---
APPROVED	---

ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

DATE 2003/MM/DD
SCALE 1:3000
DRAWN by APL
PERMIT

RANGE ROAD 231
FROM WYE ROAD TO
TWP. RD. 522

RIGHT OF WAY REQUIREMENT



LEGEND

PROFILE

- EXISTING GROUND CL
- ASBUILT EAST DITCH
- ASBUILT WEST DITCH
- ASBUILT CENTERLINE

PLAN

- PROPERTY LINE
- FENCE
- NUL/GAS LINE
- TAU/POWER LINE
- AGT/TELEPHONE LINE
- EXISTING RIGHT DITCH
- EXISTING LEFT DITCH
- BACKSLOPE LIMITS
- HORIZONTAL BASELINE
- ORIG. TOPO FEATURES ie ROAD , BLDG
- TREE
- BUSH
- SLOUGH/WATER
- DIRECTION OF FLOW
- CULVERT
- PROPOSED PROPERTY LINE
- PROPOSED SIDEWALK

NOTES:

1. MINIMUM PRIVATE APPROACH SAFETY SIGHTLINE DISTANCE MEASURED FROM INTERSECTION OF CENTRELINE PAVED ROADWAY AND PRIVATE APPROACH, UNLESS OTHERWISE SPECIFIED.
2. ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS ONLY. THE CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES PRIOR TO CONSTRUCTION TO LOCATE AND PROTECT EXISTING UTILITIES.
3. ALL REPLACEMENT OR VERT. TO BE MIN. 6M WIDE FOR PRIVATE APPROACHES AND FOR TWINNING SPACE UNLESS OTHERWISE NOTED. ALL CULVERTS TO BE LOCATED AT EXISTING CULVERT LOCATIONS. MINIMUM CULVERT LENGTH OF 10.0 METRES.
4. MINIMUM WIDTH OF 4.5m FOR PRIVATE APPROACHES TO BE TAPERED TO MATCH EXISTING.
5. USE OF MUNICIPAL RESERVE LANDS MUST BE APPROVED BY CROSSFIELD (COUNTY) COUNCIL & ENTERED INTO A LICENSE AGREEMENT.
6. ANY TRAFFIC CONTROL SIGNS TO BE REMOVED AND/OR RELOCATED AS PART OF THIS PROJECT TO BE REINSTALLED BY THE CONTRACTOR.

No.	DATE	BY	ENG	SUBJECT

REVISIONS

Stantec

ENGINEERING & ENVIRONMENTAL PLANNING

JOB NUMBER	---
SURVEY, DATE & BOOK	
DRAWN	-----
DESIGNED	---
CHECKED	---
APPROVED	---
APPROVED	---

ENGINEER | REGISTERED ENGINEERING TECHNOLOGIST

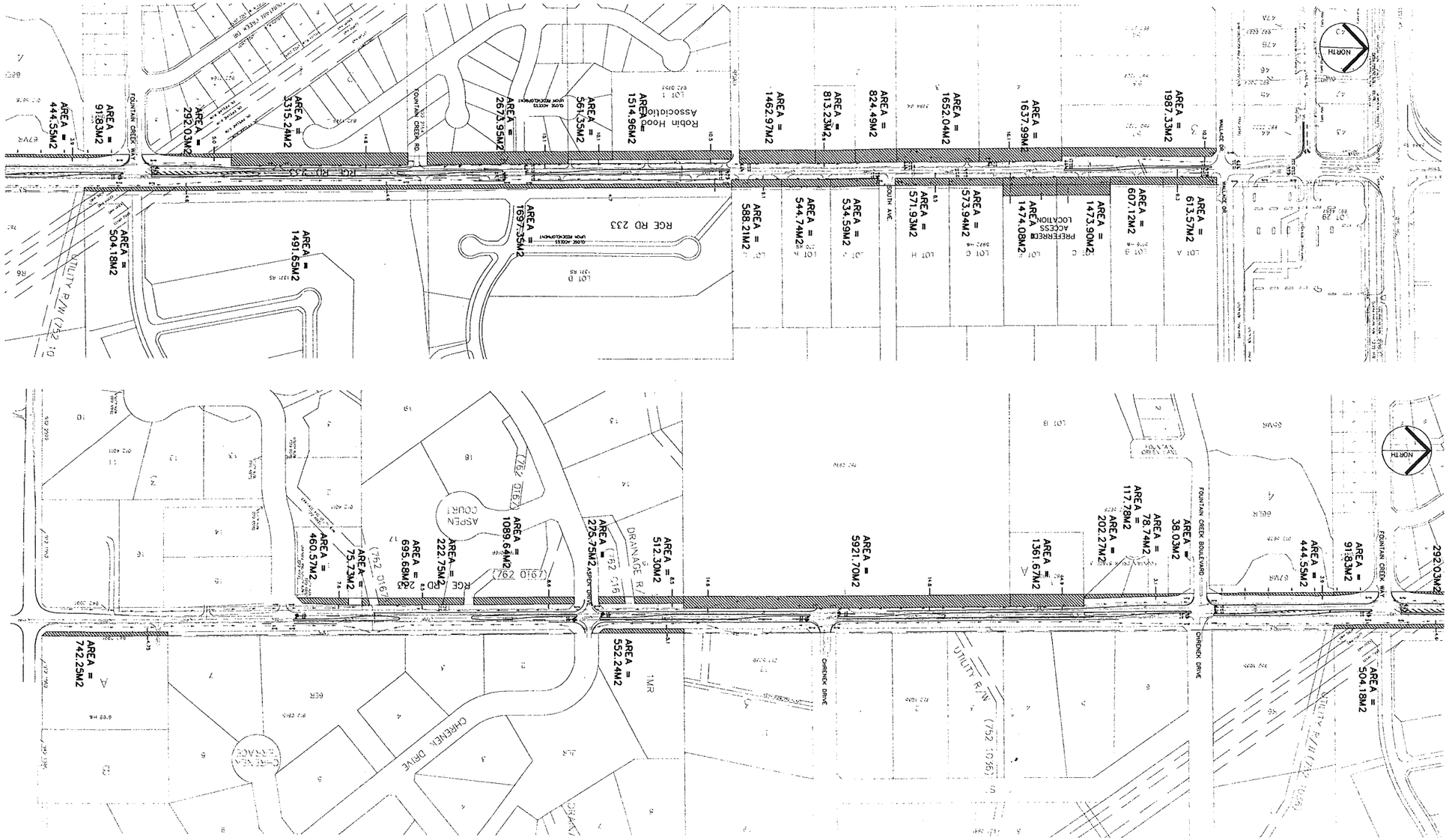
DATE 2003/MM/DD	PERMIT
SCALE	
DRAWN by APL	

RANGE ROAD 232 FROM WYE ROAD TO TWP. RD. 522

RIGHT OF WAY REQUIREMENT

DRAWING NUMBER	REV	SHEET
232 SHEET 01	A	1

EARTH TECH
A TYCO INTERNATIONAL LTD COMPANY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AREA = 918.3M2
AREA = 292.03M2
AREA = 3315.24M2
AREA = 2673.95M2
AREA = 561.35M2
AREA = 1514.96M2
Robin Hood Association
AREA = 1462.97M2
AREA = 813.23M2
AREA = 824.49M2
AREA = 1652.04M2
AREA = 1637.99M2
AREA = 1987.33M2
AREA = 1491.65M2
AREA = 504.18M2
AREA = 1697.35M2
AREA = 588.21M2
AREA = 544.74M2
AREA = 534.59M2
AREA = 571.93M2
AREA = 573.94M2
AREA = 1474.08M2
AREA = 1473.90M2
AREA = 607.12M2
AREA = 613.57M2
PREFERRED ACCESS LOCATION
FOUNTAIN CREEK RD.
FOUNTAIN CREEK WAY
WALLACE DR.
SOUTH AVE.
RGE RD 233
UTILITY R/W (752 1067)
NORTH
AREA = 742.25M2
AREA = 460.57M2
AREA = 75.7M2
AREA = 695.68M2
AREA = 222.75M2
AREA = 1089.64M2
AREA = 225.75M2
AREA = 512.30M2
AREA = 552.24M2
AREA = 5921.70M2
AREA = 1361.67M2
AREA = 38.03M2
AREA = 78.74M2
AREA = 117.78M2
AREA = 202.27M2
ASPEN COURT
CHERNEK DRIVE
DRAINAGE R/W
RGE RD 233 (762 0167)
(762 0167)
(762 0167)
(

APPENDIX J

COST ESTIMATES

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

Project: **Range Road 231**

Multi-Use Trail	$	118,000
Intersection Treatment	$	114,000
Urban Roadway	$	1,284,000
Rural Roadway	$	1,760,000
Total Estimated Cost:	$	3,276,000
Total Estimated Cost (rounded):	**$**	**3,276,000**

Note: Estimated Costs include 10% contingenc

Date: March 8, 2004

EARTH TECH
A tyco INTERNATIONAL LTD. COMPANY

Preliminary Multi-Use Trail Construction

Project: Range Road 231

Bid Item Description	Unit	Estimated Quantity	Unit Price	Estimated Cost
Granular Base Course, Des 2 Class 2	t	3,460	$ 11.00	$38,060
Asphalt Concrete Pavement - EPS Mix Type	t	1,499	$ 40.00	$59,960
			Subtotal:	**$98,020**
Supply of Aggregate - Contractor Supply - No Optio	t	4,959	$2.00	$9,918

Note:
Estimate based on 2003 Average Unit Prices for Alberta Transportation Projects. Contingency excludes supply o aggregate and mobilization

Estimated Grading Cost	$	107,938
10% Contingency:	$	9,802
Total:	$	117,740
Total Estimated Cost (rounded):	**$**	**118,000**

Date: March 8, 2004

EARTH TECH
A tyco INTERNATIONAL LTD. COMPANY

Preliminary Intersection Construction Summary

Project: Range Road 231

Bid Item Description	Unit	Estimated Quantity	Unit Price	Estimated Cost
Thomson Road - Sta. 2+565				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	52	$4.00	$208
Culverts - Supply and Install (800mm dia CSP)	m	10	$160.00	$1,600
Granular Base Course, Des 2 Class 25	t	73	$11.00	$803
Asphalt Concrete Pavement - EPS Mix Type 4	t	135	$40.00	$5,400
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.1	$400.00	$40
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$8,051**
Thomson Avenue - Sta. 2+040				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	52	$4.00	$208
Culverts - Supply and Install (800mm dia CSP)	m	10	$160.00	$1,600
Granular Base Course, Des 2 Class 25	t	70	$11.00	$770
Asphalt Concrete Pavement - EPS Mix Type 4	t	156	$40.00	$6,240
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.1	$400.00	$40
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$8,858**
Windsor Drive - Sta. 1+540				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	129	$4.00	$516
Culverts - Supply and Install (800mm dia CSP)	m	20	$160.00	$3,200
Granular Base Course, Des 2 Class 25	t	133	$11.00	$1,463
Asphalt Concrete Pavement - EPS Mix Type 4	t	265	$40.00	$10,600
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.2	$400.00	$80
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$15,859**
Windsor Drive / Sconadale Road - Sta. 1+140				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	129	$4.00	$516
Culverts - Supply and Install (800mm dia CSP)	m	20	$160.00	$3,200
Granular Base Course, Des 2 Class 25	t	133	$11.00	$1,463
Asphalt Concrete Pavement - EPS Mix Type 4	t	265	$40.00	$10,600
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.2	$400.00	$80
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$15,859**
Deer Mountain / New Access - Sta. 0+480				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	245	$4.00	$979
Culverts - Supply and Install (800mm dia CSP)	m	20	$160.00	$3,200
Granular Base Course, Des 2 Class 25	t	187	$11.00	$2,057
Asphalt Concrete Pavement - EPS Mix Type 4	t	306	$40.00	$12,240
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.2	$400.00	$80
Curb and Gutter	m	0	$79.00	$0
Street Light Standard	unit	4	$3,500.00	$14,000
Cast In Place Concrete Base	unit	4	$800.00	$3,200
Secondary Cable - Supply and Install	m	100	$15.00	$1,500
Trenching and Backfilling	m	100	$10.00	$1,000
			Subtotal:	**$38,256**
New Access for Hwy. 628 - Sta. 0+200				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	365	$4.00	$1,460
Culverts - Supply and Install (800mm dia CSP)	m	10	$160.00	$1,600
Granular Base Course, Des 2 Class 25	t	170	$11.00	$1,870
Asphalt Concrete Pavement - EPS Mix Type 4	t	194	$40.00	$7,760
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.1	$400.00	$40
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$12,730**
Supply of Aggregate - Contractor Supply - No Option	t	2,087	$2.00	$4,174

Note:
Estimate based on 2003 Average Unit Prices for Alberta Transportation Projects. Contingency excludes supply of aggregate and mobilization

Estimated Grading Cost:	$	103,787
10% Contingency:	$	9,961
Total:	$	113,748
Total Estimated Cost (rounded):	**$**	**114,000**

Date: March 8, 2004

EARTH TECH
A tyco INTERNATIONAL LTD. COMPANY

Preliminary Urban Roadway Summary

Project: Range Road 231

Bid Item Description	Unit	Estimated Quantity	Unit Price	Estimated Cost
Grading				
Supply of Aggregate - Contractor Supply - No Optio	t	210	$2.00	$419
Clearing	ha	0.1	$4,000.00	$400
Channel Excavation	m3	810	$4.20	$3,402
Common Excavation	m3	9,910	$3.00	$29,730
Borrow Excavation - Contractor's Supply	m3	38,340	$4.00	$153,360
Topsoil Placement	m2	16,510	$0.35	$5,779
New Fence - Supply and Install - Class E	km	1.8	$4,500.00	$8,100
Culverts - Remove and Dispose (CSP) up to 700mm	m	41	$45.00	$1,845
Culverts - Remove and Dispose (CSP) over 700mm	m	10	$60.00	$600
Granular Backfill - Culverts	m3	90	$18.00	$1,620
Culverts - Supply and Install (800mm dia CSP	m	50	$160.00	$8,000
Culvert Liner - Supply and Install (750mm dia.	m	63	$160.00	$10,080
Seeding, Fertilizing and Harrowing	ha	1.7	$750.00	$1,275
Street Light Standard	unit	48	$3,500.00	$168,000
Cast In Place Concrete Base	unit	48	$800.00	$38,400
Secondary Cable - Supply and Instal	m	2,800	$15.00	$42,000
Trenching and Backfilling	m	2,800	$10.00	$28,000
Supply of Signs - Level 1, 1/2" Plywood	m2	6	$220.00	$1,320
Removal, Reinstall or Disposal of Exist. Signs - One Pos	signs	3	$70.00	$210
Install Sign - Less than 1m2	signs	6	$40.00	$240
Supply & Install Sign Post - 100mm x 150mm	posts	6	$100.00	$600
Flexible Guide Post/Delineators - Round - Supply and Insta	posts	30	$33.00	$990
			Subtotal:	**$504,370**
Surfacing				
Preparing Subgrade Surface (1st Layer	m2	6,660	$0.60	$3,996
Granular Base Course, Des 2 Class 25	t	5,341	$11.00	$58,751
Asphalt Concrete Pavement - EPS Mix Type 4	t	4,007	$40.00	$160,280
Cold Milling Asphalt Pavemen	m2	990	$5.00	$4,950
Pavement Messages - Gore Area	messages	2	$600.00	$1,200
Pavement Messages - Stop Bar	messages	4	$100.00	$400
Roadway Lines-Supplying Paint and Painting(Dir Div & 1 Edge Line	km	2	$400.00	$720
Roadway Lines-Supplying Paint and Painting(Lane Div Lines	km	2	$400.00	$800
Concrete Curb - Barrier Type	m	740	$110.00	$81,400
Median Concrete Surfacing	m2	1,648	$50.00	$82,400
Curb and Gutter	m	1,800	$79.00	$142,200
Cutting of Pavement Edge	m	2,010	$10.00	$20,100
Supply of Aggregate - Contractor Supply - No Optio	t	9,348	$2.00	$18,696
			Subtotal:	**$575,893**
Mobilization (9%)	lump sum	1	50,150	$97,224

Note:
Estimate based on 2003 Average Unit Prices for Alberta Transportation Projects. Contingency excludes supply o aggregate and mobilization

Estimated Grading Cost:	$	1,177,487
10% Contingency:	$	106,115
Total:	$	1,283,601
Total Estimated Cost (rounded):	**$**	**1,284,000**

Date: March 8, 2004

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

Preliminary Rural Roadway Summary

Project: Range Road 231

Bid Item Description	Unit	Estimated Quantity	Unit Price	Estimated Cost
Grading				
Supply of Aggregate - Contractor Supply - No Option	t	489	$2.00	$979
Clearing	ha	0.3	$4,000.00	$1,200
Channel Excavation	m3	1,890	$4.20	$7,938
Common Excavation	m3	23,109	$3.00	$69,327
Borrow Excavation - Contractor's Supply	m3	46,483	$4.00	$185,932
Topsoil Placement	m2	38,521	$0.35	$13,482
New Fence - Supply and Install - Class B	km	4	$4,500.00	$18,450
Culverts - Remove and Dispose (CSP) up to 700mm	m	94	$45.00	$4,230
Culverts - Remove and Dispose (CSP) over 700mm	m	20	$60.00	$1,200
Granular Backfill - Culverts	m3	210	$18.00	$3,780
Culverts - Supply and Install (800mm dia CSP)	m	115	$160.00	$18,400
Culvert Liner - Supply and Install (750mm dia.)	m	147	$160.00	$23,520
Seeding, Fertilizing and Harrowing	ha	4	$750.00	$2,850
Supply of Signs - Level 1, 1/2" Plywood	m2	14	$220.00	$3,080
Removal, Reinstall or Disposal of Exist. Signs - One Post	signs	7	$70.00	$490
Install Sign - Less than 1m2	signs	14	$40.00	$560
Supply & Install Sign Post - 100mm x 150mm	posts	14	$100.00	$1,400
Flexible Guide Post/Delineators - Round - Supply and Install	posts	70	$33.00	$2,310
			Subtotal:	**$359,128**
Surfacing				
Preparing Subgrade Surface (1st Layer)	m2	22,867	$0.60	$13,720
Granular Base Course, Des 2 Class 25	t	11,422	$11.00	$125,642
Asphalt Concrete Pavement - EPS Mix Type 4	t	6,893	$40.00	$275,720
Cold Milling Asphalt Pavement	m2	2,310	$5.00	$11,550
Pavement Messages - Gore Area	messages	5	$600.00	$3,000
Pavement Messages - Stop Bar	messages	10	$100.00	$1,000
Roadway Lines-Supplying Paint and Painting(Dir Div & 1 Edge Line)	km	4.1	$400.00	$1,640
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.5	$400.00	$200
Concrete Curb - Barrier Type	m	2,061	$110.00	$226,710
Median Concrete Surfacing	m2	4,122	$50.00	$206,100
Curb and Gutter	m	0	$79.00	$0
Cutting of Pavement Edge	m	22,128	$10.00	$221,280
Supply of Aggregate - Contractor Supply - No Option	t	18,315	$2.00	$36,630
			Subtotal:	**$1,123,192**
Mobilization (9%)	lump sum	1	97,790	$133,409

Note:
Estimate based on 2003 Average Unit Prices for Alberta Transportation Projects. Contingency excludes supply of aggregate and mobilization

Estimated Grading Cost:	$	1,615,729
10% Contingency:	$	144,471
Total:	$	1,760,200
Total Estimated Cost (rounded):	**$**	**1,760,000**

Date: March 8, 2004

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

Project: **Range Road 232**

Multi-Use Trail	$	114,000
Intersection Treatment	$	285,000
Urban Roadway	$	920,000
Rural Roadway	$	2,984,000
Total Estimated Cost:	$	4,303,000
Total Estimated Cost (rounded):	**$**	**4,303,000**

Note: Estimated Costs include 10% contingency

Date: March 8, 2004

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

Preliminary Multi-Use Trail Construction

Project: Range Road 232

Bid Item Description	Unit	Estimated Quantity	Unit Price	Estimated Cost
Granular Base Course, Des 2 Class 25	t	3,355	$ 11.00	$36,905
Asphalt Concrete Pavement - EPS Mix Type 4	t	1,454	$ 40.00	$58,160
			Subtotal:	**$95,065**
Supply of Aggregate - Contractor Supply - No Option	t	4,809	$2.00	$9,618

Note:
Estimate based on 2003 Average Unit Prices for Alberta Transportation Projects. Contingency excludes supply o aggregate and mobilization

Estimated Grading Cost:	$	104,683
10% Contingency:	$	9,507
Total:	$	114,190
Total Estimated Cost (rounded):	**$**	**114,000**

Date: March 8, 2004

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

Preliminary Intersection Construction Summary

Project: Range Road 232

Bid Item Description	Unit	Estimated Quantity	Unit Price	Estimated Cost
Estate Drive - Sta. 2+720				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	481	$4.00	$1,924
Culverts - Supply and Install (800mm dia CSP)	m	45	$160.00	$7,200
Granular Base Course, Des 2 Class 25	t	623	$11.00	$6,853
Asphalt Concrete Pavement - EPS Mix Type 4	t	472	$40.00	$18,880
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.2	$400.00	$80
Curb and Gutter	m	300	$79.00	$23,700
Street Light Standard	unit	8	$3,500.00	$28,000
Cast In Place Concrete Base	unit	8	$800.00	$6,400
Secondary Cable - Supply and Install	m	300	$15.00	$4,500
Trenching and Backfilling	m	300	$10.00	$3,000
			Subtotal:	**$100,537**
Private Access @ Lot 41 - Sta. 2+360				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	673	$4.00	$2,692
Culverts - Supply and Install (800mm dia CSP)	m	24	$160.00	$3,840
Granular Base Course, Des 2 Class 25	t	591	$11.00	$6,501
Asphalt Concrete Pavement - EPS Mix Type 4	t	444	$40.00	$17,760
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.2	$400.00	$80
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$30,873**
Central Drive - Sta. 2+250				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	0	$4.00	$0
Culverts - Supply and Install (800mm dia CSP)	m	14	$160.00	$2,240
Granular Base Course, Des 2 Class 25	t	155	$11.00	$1,705
Asphalt Concrete Pavement - EPS Mix Type 4	t	116	$40.00	$4,640
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.1	$400.00	$40
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$8,625**
Yorkley Drive - Sta. 2+145				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	0	$4.00	$0
Culverts - Supply and Install (800mm dia CSP)	m	14	$160.00	$2,240
Granular Base Course, Des 2 Class 25	t	155	$11.00	$1,705
Asphalt Concrete Pavement - EPS Mix Type 4	t	116	$40.00	$4,640
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.1	$400.00	$40
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$8,625**
Yorkley Drive - Sta. 1+830				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	129	$4.00	$516
Culverts - Supply and Install (800mm dia CSP)	m	20	$160.00	$3,200
Granular Base Course, Des 2 Class 25	t	133	$11.00	$1,463
Asphalt Concrete Pavement - EPS Mix Type 4	t	265	$40.00	$10,600
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.2	$400.00	$80
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$15,859**

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

Preliminary Intersection Construction Summary

Project: Range Road 232

Bid Item Description	Unit	Estimated Quantity	Unit Price	Estimated Cost
Edward Crescent / Scot Crescent - Sta. 1+510				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	48	$4.00	$192
Culverts - Supply and Install (800mm dia CSP)	m	30	$160.00	$4,800
Granular Base Course, Des 2 Class 25	t	276	$11.00	$3,036
Asphalt Concrete Pavement - EPS Mix Type 4	t	206	$40.00	$8,240
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.2	$400.00	$80
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$16,348**
Edward Crescent - Sta. 0+940				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	129	$4.00	$516
Culverts - Supply and Install (800mm dia CSP)	m	20	$160.00	$3,200
Granular Base Course, Des 2 Class 25	t	133	$11.00	$1,463
Asphalt Concrete Pavement - EPS Mix Type 4	t	265	$40.00	$10,600
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.2	$400.00	$80
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$15,859**
Winfield Crescent / Edelweiss Avenue - Sta. 0+670				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	0	$4.00	$0
Culverts - Supply and Install (800mm dia CSP)	m	50	$160.00	$8,000
Granular Base Course, Des 2 Class 25	t	347	$11.00	$3,817
Asphalt Concrete Pavement - EPS Mix Type 4	t	261	$40.00	$10,440
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.2	$400.00	$80
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$22,337**
Cranberry Crescent - Sta. 0+500				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	52	$4.00	$208
Culverts - Supply and Install (800mm dia CSP)	m	10	$160.00	$1,600
Granular Base Course, Des 2 Class 25	t	70	$11.00	$770
Asphalt Concrete Pavement - EPS Mix Type 4	t	156	$40.00	$6,240
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.1	$400.00	$40
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$8,858**
New Access for Hwy. 628 - Sta. 0+210				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	0	$4.00	$0
Culverts - Supply and Install (800mm dia CSP)	m	50	$160.00	$8,000
Granular Base Course, Des 2 Class 25	t	318	$11.00	$3,498
Asphalt Concrete Pavement - EPS Mix Type 4	t	240	$40.00	$9,600
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.1	$400.00	$40
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$21,138**
Supply of Aggregate - Contractor Supply - No Option	t	5,342	$2.00	$10,684

Note:
Estimate based on 2003 Average Unit Prices for Alberta Transportation Projects. Contingency excludes supply of aggregate and mobilization

Estimated Grading Cost:	$	259,743
10% Contingency:	$	24,906
Total:	$	284,649
Total Estimated Cost (rounded):	**$**	**285,000**

Date: March 8, 2004

EARTH TECH
A tyco INTERNATIONAL LTD. COMPANY

Preliminary Urban Roadway Summary

Project: Range Road 232

Bid Item Description	Unit	Estimated Quantity	Unit Price	Estimated Cost
Grading				
Supply of Aggregate - Contractor Supply - No Optio	t	56	$2.00	$112
Clearing	ha	0.4	$4,000.00	$1,600
Channel Excavation	m3	1,710	$4.20	$7,182
Common Excavation	m3	11,900	$3.00	$35,700
Borrow Excavation - Contractor's Supp	m3	4,440	$4.00	$17,760
Topsoil Placement	m2	19,835	$0.35	$6,942
New Fence - Supply and Install - Class E	km	1.7	$4,500.00	$7,650
Culverts - Remove and Dispose (CSP) up to 700mm	m	14	$45.00	$630
Culverts - Remove and Dispose (CSP) over 700mm	m	9	$60.00	$540
Granular Backfill - Culverts	m3	24	$18.00	$432
Culverts - Supply and Install (800mm dia CSP	m	25	$160.00	$4,000
Culvert Liner - Supply and Install (750mm dia.	m	108	$160.00	$17,280
Seeding, Fertilizing and Harrowing	ha	2.0	$750.00	$1,500
Street Light Standard	unit	48	$3,500.00	$168,000
Cast In Place Concrete Base	unit	48	$800.00	$38,400
Secondary Cable - Supply and Instal	m	2,400	$15.00	$36,000
Trenching and Backfilling	m	2,400	$10.00	$24,000
Supply of Signs - Level 1, 1/2" Plywood	m2	11	$220.00	$2,420
Removal, Reinstall or Disposal of Exist. Signs - One Pos	signs	11	$70.00	$770
Install Sign - Less than 1m2	signs	11	$40.00	$440
Supply & Install Sign Post - 100mm x 150mm	posts	11	$100.00	$1,100
Flexible Guide Post/Delineators - Round - Supply and Insta	posts	42	$33.00	$1,386
			Subtotal:	**$373,844**
Surfacing				
Preparing Subgrade Surface (1st Layer	m2	4,440	$0.60	$2,664
Granular Base Course, Des 2 Class 25	t	2,069	$11.00	$22,759
Asphalt Concrete Pavement - EPS Mix Type 4	t	1,552	$40.00	$62,080
Cold Milling Asphalt Pavemen	m2	975	$5.00	$4,875
Pavement Messages - Gore Area	messages	2	$600.00	$1,200
Pavement Messages - Stop Bar	messages	6	$100.00	$600
Roadway Lines-Supplying Paint and Painting(Dir Div & 1 Edge Line	km	1.7	$400.00	$680
Roadway Lines-Supplying Paint and Painting(Lane Div Lines	km	1.2	$400.00	$480
Concrete Curb - Barrier Type	m	780	$110.00	$85,800
Median Concrete Surfacing	m2	1,948	$50.00	$97,400
Curb and Gutter	m	1,200	$79.00	$94,800
Cutting of Pavement Edge	m	1,950	$10.00	$19,500
Supply of Aggregate - Contractor Supply - No Optio	t	3,621	$2.00	$7,242
			Subtotal:	**$400,080**
Mobilization (9%)	lump sum	1	35,360	$69,653

Note:
Estimate based on 2003 Average Unit Prices for Alberta Transportation Projects. Contingency excludes supply o aggregate and mobilization

Estimated Grading Cost	$	843,577
10% Contingency:	$	76,657
Total:	$	920,234
Total Estimated Cost (rounded):	**$**	**920,000**

Date: March 8, 2004

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

Preliminary Rural Roadway Summary

Project: Range Road 232

Bid Item Description	Unit	Estimated Quantity	Unit Price	Estimated Cost
Grading				
Supply of Aggregate - Contractor Supply - No Option	t	130	$2.00	$261
Clearing	ha	0.9	$4,000.00	$3,600
Channel Excavation	m3	3,990	$4.20	$16,758
Common Excavation	m3	27,774	$3.00	$83,322
Borrow Excavation - Contractor's Supply	m3	91,478	$4.00	$365,912
Topsoil Placement	m2	46,289	$0.35	$16,201
New Fence - Supply and Install - Class B	km	3.9	$4,500.00	$17,550
Culverts - Remove and Dispose (CSP) up to 700mm	m	31	$45.00	$1,395
Culverts - Remove and Dispose (CSP) over 700mm	m	21	$60.00	$1,260
Granular Backfill - Culverts	m3	56	$18.00	$1,008
Culverts - Supply and Install (800mm dia CSP)	m	50	$160.00	$8,000
Culvert Liner - Supply and Install (750mm dia.)	m	252	$160.00	$40,320
Seeding, Fertilizing and Harrowing	ha	4.6	$750.00	$3,450
Supply of Signs - Level 1, 1/2" Plywood	m2	25	$220.00	$5,500
Removal, Reinstall or Disposal of Exist. Signs - One Post	signs	25	$70.00	$1,750
Install Sign - Less than 1m2	signs	25	$40.00	$1,000
Supply & Install Sign Post - 100mm x 150mm	posts	25	$100.00	$2,500
Flexible Guide Post/Delineators - Round - Supply and Install	posts	98	$33.00	$3,234
			Subtotal:	**$573,021**
Surfacing				
Preparing Subgrade Surface (1st Layer)	m2	31,642	$0.60	$18,985
Granular Base Course, Des 2 Class 25	t	13,422	$11.00	$147,642
Asphalt Concrete Pavement - EPS Mix Type 4	t	9,654	$40.00	$386,160
Cold Milling Asphalt Pavement	m2	2,275	$5.00	$11,375
Pavement Messages - Gore Area	messages	4	$600.00	$2,400
Pavement Messages - Stop Bar	messages	13	$100.00	$1,300
Roadway Lines-Supplying Paint and Painting(Dir Div & 1 Edge Line)	km	3.9	$400.00	$1,560
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	1.0	$400.00	$400
Concrete Curb - Barrier Type	m	3,680	$110.00	$404,800
Median Concrete Surfacing	m2	5,435	$50.00	$271,750
Curb and Gutter	m	5,300	$79.00	$418,700
Cutting of Pavement Edge	m	22,725	$10.00	$227,250
Supply of Aggregate - Contractor Supply - No Option	t	23,076	$2.00	$46,152
			Subtotal:	**$1,938,474**
Mobilization (9%)	lump sum	1	170,310	$226,035

Note:
Estimate based on 2003 Average Unit Prices for Alberta Transportation Projects. Contingency excludes supply of aggregate and mobiljzation

Estimated Grading Cost:	$	2,737,530
10% Contingency:	$	246,508
Total:	$	2,984,038
Total Estimated Cost (rounded):	**$**	**2,984,000**

Date: March 8, 2004

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

Project: **Range Road 233**

Multi-Use Trail	$	114,000
Intersection Treatment	$	545,000
Urban Roadway	$	1,589,000
Rural Roadway	$	2,240,000
Total Estimated Cost:	$	4,488,000
Total Estimated Cost (rounded):	**$**	**4,488,000**

Note: Estimated Costs include 10% contingency

Date: March 8, 2004

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

Preliminary Multi-Use Trail Construction

Project: Range Road 23

Bid Item Description	Unit	Estimated Quantity	Unit Price	Estimated Cost
Granular Base Course, Des 2 Class 2	t	3,355	$ 11.00	$36,905
Asphalt Concrete Pavement - EPS Mix Type	t	1,454	$ 40.00	$58,160
			Subtotal:	**$95,065**
Supply of Aggregate - Contractor Supply - No Optio	t	4,809	$2.00	$9,618

Note:
Estimate based on 2003 Average Unit Prices for Alberta Transportation Projects. Contingency excludes supply o aggregate and mobilization

Estimated Grading Cost:	$	104,683
10% Contingency:	$	9,507
Total:	$	114,190
Total Estimated Cost (rounded):	**$**	**114,000**

Date: March 8, 2004

EARTH TECH
A tyco INTERNATIONAL LTD. COMPANY

Preliminary Intersection Construction Summary

Project: Range Road 233

Bid Item Description	Unit	Estimated Quantity	Unit Price	Estimated Cost
Ordze Avenue - Sta. 3+140				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	0	$4.00	$0
Culverts - Supply and Install (800mm dia CSP)	m	0	$160.00	$0
Granular Base Course, Des 2 Class 25	t	0	$11.00	$0
Asphalt Concrete Pavement - EPS Mix Type 4	t	0	$40.00	$0
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.1	$400.00	$40
Curb and Gutter	m	0	$79.00	$0
Street Light Standard	unit	4	$3,500.00	$14,000
Cast In Place Concrete Base	unit	4	$800.00	$3,200
Secondary Cable - Supply and Install	m	200	$15.00	$3,000
Trenching and Backfilling	m	200	$10.00	$2,000
			Subtotal:	**$22,240**
Wallace Drive - Sta. 3+040				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	0	$4.00	$0
Culverts - Supply and Install (800mm dia CSP)	m	50	$160.00	$8,000
Granular Base Course, Des 2 Class 25	t	423	$11.00	$4,653
Asphalt Concrete Pavement - EPS Mix Type 4	t	319	$40.00	$12,760
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.2	$400.00	$80
Curb and Gutter	m	100	$79.00	$7,900
Street Light Standard	unit	4	$3,500.00	$14,000
Cast In Place Concrete Base	unit	4	$800.00	$3,200
Secondary Cable - Supply and Install	m	200	$15.00	$3,000
Trenching and Backfilling	m	200	$10.00	$2,000
			Subtotal:	**$55,593**
Private Access - Sta. 2+820				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	2,520	$4.00	$10,080
Culverts - Supply and Install (800mm dia CSP)	m	40	$160.00	$6,400
Granular Base Course, Des 2 Class 25	t	626	$11.00	$6,886
Asphalt Concrete Pavement - EPS Mix Type 4	t	470	$40.00	$18,800
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.2	$400.00	$80
Curb and Gutter	m	300	$79.00	$23,700
Street Light Standard	unit	4	$3,500.00	$14,000
Cast In Place Concrete Base	unit	4	$800.00	$3,200
Secondary Cable - Supply and Install	m	300	$15.00	$4,500
Trenching and Backfilling	m	300	$10.00	$3,000
			Subtotal:	**$90,646**
Private Access @ Lot G - Sta. 2+750				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	76	$4.00	$304
Culverts - Supply and Install (800mm dia CSP)	m	35	$160.00	$5,600
Granular Base Course, Des 2 Class 25	t	189	$11.00	$2,079
Asphalt Concrete Pavement - EPS Mix Type 4	t	140	$40.00	$5,600
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.1	$400.00	$40
Curb and Gutter	m	100	$79.00	$7,900
			Subtotal:	**$21,523**
South Avenue - Sta. 2+620				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	0	$4.00	$0
Culverts - Supply and Install (800mm dia CSP)	m	15	$160.00	$2,400
Granular Base Course, Des 2 Class 25	t	122	$11.00	$1,342
Asphalt Concrete Pavement - EPS Mix Type 4	t	91	$40.00	$3,640
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.1	$400.00	$40
Curb and Gutter	m	120	$79.00	$9,480
			Subtotal:	**$16,902**
Private Access @ Lot L - Sta. 2+430				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	129	$4.00	$516
Culverts - Supply and Install (800mm dia CSP)	m	20	$160.00	$3,200
Granular Base Course, Des 2 Class 25	t	133	$11.00	$1,463
Asphalt Concrete Pavement - EPS Mix Type 4	t	265	$40.00	$10,600
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.2	$400.00	$80
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$15,859**

EARTH TECH
A tyco INTERNATIONAL LTD. COMPANY

Preliminary Intersection Construction Summary

Project: Range Road 233

Bid Item Description	Unit	Estimated Quantity	Unit Price	Estimated Cost
Fountain Creek Road - Sta. 2+180				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	804	$4.00	$3,216
Culverts - Supply and Install (800mm dia CSP)	m	40	$160.00	$6,400
Granular Base Course, Des 2 Class 25	t	631	$11.00	$6,941
Asphalt Concrete Pavement - EPS Mix Type 4	t	475	$40.00	$19,000
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.2	$400.00	$80
Curb and Gutter	m	0	$79.00	$0
Street Light Standard	unit	6	$3,500.00	$21,000
Cast In Place Concrete Base	unit	6	$800.00	$4,800
Secondary Cable - Supply and Install	m	200	$15.00	$3,000
Trenching and Backfilling	m	200	$10.00	$2,000
			Subtotal:	**$66,437**
Fountain Creek Way - Sta. 1+680				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	321	$4.00	$1,284
Culverts - Supply and Install (800mm dia CSP)	m	70	$160.00	$11,200
Granular Base Course, Des 2 Class 25	t	634	$11.00	$6,974
Asphalt Concrete Pavement - EPS Mix Type 4	t	475	$40.00	$19,000
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.2	$400.00	$80
Curb and Gutter	m	0	$79.00	$0
Street Light Standard	unit	6	$3,500.00	$21,000
Cast In Place Concrete Base	unit	6	$800.00	$4,800
Secondary Cable - Supply and Install	m	200	$15.00	$3,000
Trenching and Backfilling	m	200	$10.00	$2,000
			Subtotal:	**$69,338**
Fountain Creek Boulevard / Chrenek Drive - Sta. 1+455				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	277	$4.00	$1,108
Culverts - Supply and Install (800mm dia CSP)	m	50	$160.00	$8,000
Granular Base Course, Des 2 Class 25	t	437	$11.00	$4,807
Asphalt Concrete Pavement - EPS Mix Type 4	t	328	$40.00	$13,120
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.2	$400.00	$80
Curb and Gutter	m	0	$79.00	$0
Street Light Standard	unit	4	$3,500.00	$14,000
Cast In Place Concrete Base	unit	4	$800.00	$3,200
Secondary Cable - Supply and Install	m	100	$15.00	$1,500
Trenching and Backfilling	m	100	$10.00	$1,000
			Subtotal:	**$46,815**
Chrenek Drive - Sta. 0+990				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	778	$4.00	$3,112
Culverts - Supply and Install (800mm dia CSP)	m	50	$160.00	$8,000
Granular Base Course, Des 2 Class 25	t	559	$11.00	$6,149
Asphalt Concrete Pavement - EPS Mix Type 4	t	419	$40.00	$16,760
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.2	$400.00	$80
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$34,101**
Aspen Drive - Sta. 0+700				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	0	$4.00	$0
Culverts - Supply and Install (800mm dia CSP)	m	50	$160.00	$8,000
Granular Base Course, Des 2 Class 25	t	347	$11.00	$3,817
Asphalt Concrete Pavement - EPS Mix Type 4	t	261	$40.00	$10,440
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.2	$400.00	$80
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$22,337**
New Access for Hwy. 628 - Sta. 0+310				
Common Excavation	m3	0	$3.00	$0
Borrow Excavation - Contractor's Supply	m3	0	$4.00	$0
Culverts - Supply and Install (800mm dia CSP)	m	50	$160.00	$8,000
Granular Base Course, Des 2 Class 25	t	318	$11.00	$3,498
Asphalt Concrete Pavement - EPS Mix Type 4	t	240	$40.00	$9,600
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	0.1	$400.00	$40
Curb and Gutter	m	0	$79.00	$0
			Subtotal:	**$21,138**
Supply of Aggregate - Contractor Supply - No Option	t	6,806	$2.00	$13,612

Note:
Estimate based on 2003 Average Unit Prices for Alberta Transportation Projects. Contingency excludes supply of aggregate and mobilization

Estimated Grading Cost:	$	496,541
10% Contingency:	$	48,293
Total:	$	544,834
Total Estimated Cost (rounded):	**$**	**545,000**

Date: March 8, 2004

EARTH TECH
A tyco INTERNATIONAL LTD. COMPANY

Preliminary Urban Roadway Summary

Project: Range Road 233

Bid Item Description	Unit	Estimated Quantity	Unit Price	Estimated Cost
Grading				
Supply of Aggregate - Contractor Supply - No Optio	t	56	$2.00	$112
Clearing	ha	0.2	$4,000.00	$800
Channel Excavation	m3	1,800	$4.20	$7,560
Common Excavation	m3	12,330	$3.00	$36,990
Borrow Excavation - Contractor's Supply	m3	26,265	$4.00	$105,060
Topsoil Placement	m2	20,542	$0.35	$7,190
New Fence - Supply and Install - Class E	km	1.6	$4,500.00	$7,200
Culverts - Remove and Dispose (CSP) up to 700mm	m	5	$45.00	$225
Culverts - Remove and Dispose (CSP) over 700mm	m	9	$60.00	$540
Granular Backfill - Culverts	m3	24	$18.00	$432
Culverts - Supply and Install (800mm dia CSP	m	18	$160.00	$2,880
Culvert Liner - Supply and Install (750mm dia.	m	72	$160.00	$11,520
Seeding, Fertilizing and Harrowing	ha	2.0	$750.00	$1,500
Street Light Standard	unit	60	$3,500.00	$210,000
Cast In Place Concrete Base	unit	60	$800.00	$48,000
Secondary Cable - Supply and Instal	m	3,600	$15.00	$54,000
Trenching and Backfilling	m	3,600	$10.00	$36,000
Supply of Signs - Level 1, 1/2" Plywood	m2	9	$220.00	$1,980
Removal, Reinstall or Disposal of Exist. Signs - One Pos	signs	9	$70.00	$630
Install Sign - Less than 1m2	signs	9	$40.00	$360
Supply & Install Sign Post - 100mm x 150mm	posts	9	$100.00	$900
Flexible Guide Post/Delineators - Round - Supply and Insta	posts	42	$33.00	$1,386
			Subtotal:	**$535,265**
Surfacing				
Preparing Subgrade Surface (1st Layer	m2	8,880	$0.60	$5,328
Granular Base Course, Des 2 Class 25	t	7,494	$11.00	$82,434
Asphalt Concrete Pavement - EPS Mix Type 4	t	5,620	$40.00	$224,800
Cold Milling Asphalt Pavemen	m2	975	$5.00	$4,875
Pavement Messages - Gore Area	messages	2	$600.00	$1,200
Pavement Messages - Stop Bar	messages	6	$100.00	$600
Roadway Lines-Supplying Paint and Painting(Dir Div & 1 Edge Line	km	1.6	$400.00	$640
Roadway Lines-Supplying Paint and Painting(Lane Div Lines	km	2	$400.00	$800
Concrete Curb - Barrier Type	m	1,100	$110.00	$121,000
Median Concrete Surfacing	m2	4,400	$50.00	$220,000
Curb and Gutter	m	1,200	$79.00	$94,800
Cutting of Pavement Edge	m	1,950	$10.00	$19,500
Supply of Aggregate - Contractor Supply - No Optio	t	13,114	$2.00	$26,228
			Subtotal:	**$802,205**
Mobilization (9%)	lump sum	1	69,840	$120,372

Note:
Estimate based on 2003 Average Unit Prices for Alberta Transportation Projects. Contingency excludes supply o aggregate and mobilization

Estimated Grading Cost:	$	1,457,842
10% Contingency:	$	131,113
Total:	$	1,588,955
Total Estimated Cost (rounded):	**$**	**1,589,000**

Date: March 8, 2004

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

Preliminary Rural Roadway Summary

Project: Range Road 233

Bid Item Description	Unit	Estimated Quantity	Unit Price	Estimated Cost
Grading				
Supply of Aggregate - Contractor Supply - No Option	t	130	$2.00	$261
Clearing	ha	0.5	$4,000.00	$2,000
Channel Excavation	m3	4,200	$4.20	$17,640
Common Excavation	m3	28,754	$3.00	$86,262
Borrow Excavation - Contractor's Supply	m3	76,741	$4.00	$306,964
Topsoil Placement	m2	47,931	$0.35	$16,776
New Fence - Supply and Install - Class B	km	3.6	$4,500.00	$16,200
Culverts - Remove and Dispose (CSP) up to 700mm	m	10	$45.00	$450
Culverts - Remove and Dispose (CSP) over 700mm	m	21	$60.00	$1,260
Granular Backfill - Culverts	m3	56	$18.00	$1,008
Culverts - Supply and Install (800mm dia CSP)	m	42	$160.00	$6,720
Culvert Liner - Supply and Install (750mm dia.)	m	168	$160.00	$26,880
Seeding, Fertilizing and Harrowing	ha	4.8	$750.00	$3,600
Supply of Signs - Level 1, 1/2" Plywood	m2	21	$220.00	$4,620
Removal, Reinstall or Disposal of Exist. Signs - One Post	signs	21	$70.00	$1,470
Install Sign - Less than 1m2	signs	21	$40.00	$840
Supply & Install Sign Post - 100mm x 150mm	posts	21	$100.00	$2,100
Flexible Guide Post/Delineators - Round - Supply and Install	posts	98	$33.00	$3,234
			Subtotal:	**$498,285**
Surfacing				
Preparing Subgrade Surface (1st Layer)	m2	59,593	$0.60	$35,756
Granular Base Course, Des 2 Class 25	t	11,008	$11.00	$121,088
Asphalt Concrete Pavement - EPS Mix Type 4	t	6,743	$40.00	$269,720
Cold Milling Asphalt Pavement	m2	2,275	$5.00	$11,375
Pavement Messages - Gore Area	messages	3	$600.00	$1,800
Pavement Messages - Stop Bar	messages	14	$100.00	$1,400
Roadway Lines-Supplying Paint and Painting(Dir Div & 1 Edge Line)	km	3.6	$400.00	$1,440
Roadway Lines-Supplying Paint and Painting(Lane Div Lines)	km	1.4	$400.00	$560
Concrete Curb - Barrier Type	m	2,160	$110.00	$237,600
Median Concrete Surfacing	m2	8,640	$50.00	$432,000
Curb and Gutter	m	0	$79.00	$0
Cutting of Pavement Edge	m	23,848	$10.00	$238,480
Supply of Aggregate - Contractor Supply - No Option	t	17,751	$2.00	$35,502
			Subtotal:	**$1,386,721**
Mobilization (9%)	lump sum	1	121,610	$169,651

Note:
Estimate based on 2003 Average Unit Prices for Alberta Transportation Projects. Contingency excludes supply of aggregate and mobilization

Estimated Grading Cost:	$	2,054,656
10% Contingency:	$	184,924
Total:	$	2,239,580
Total Estimated Cost (rounded):	**$**	**2,240,000**

Date: March 8, 2004

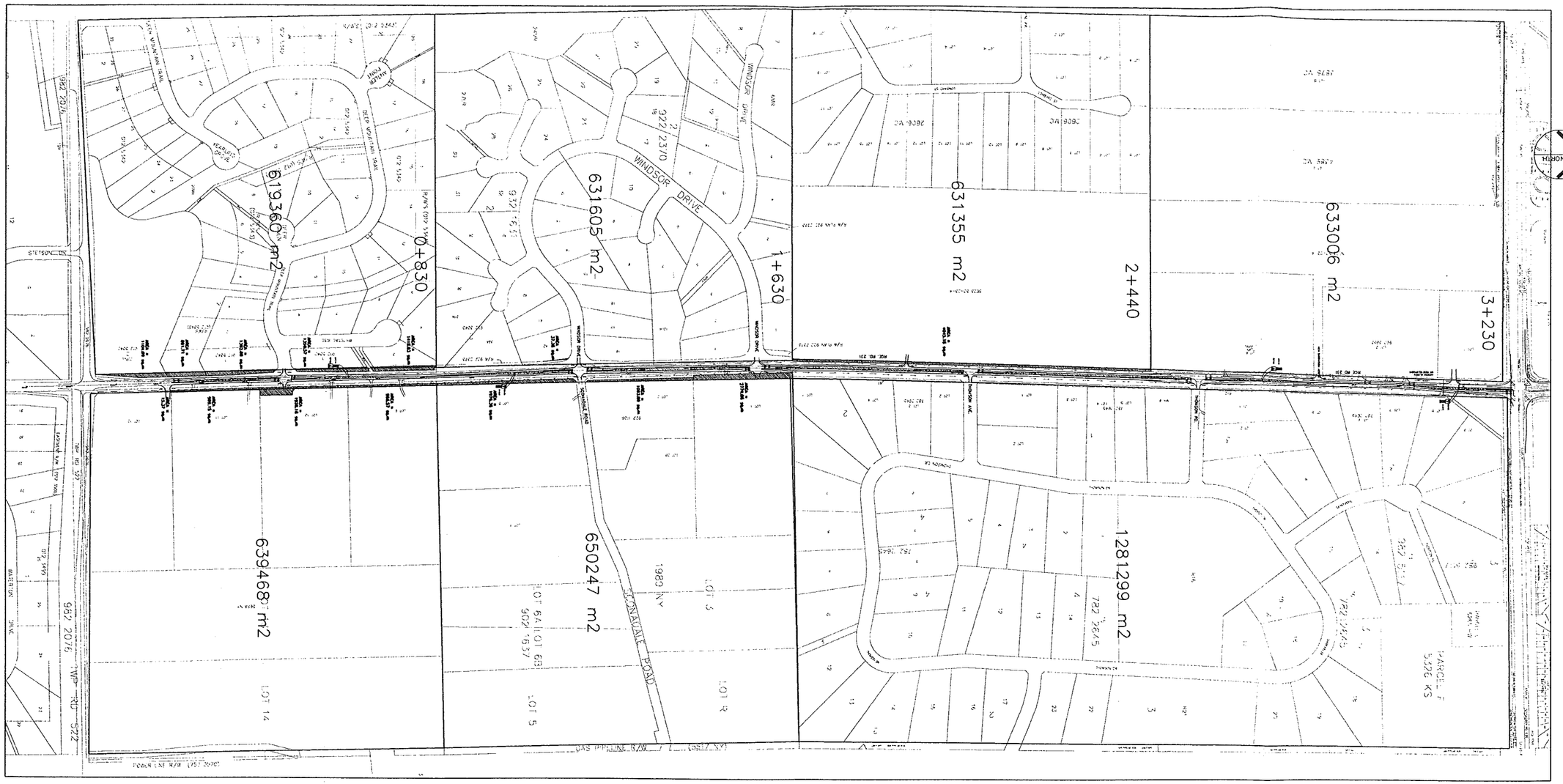
APPENDIX K

LEVY COST RECOVERY

		Area			Levy Paid By		
West of Range Road 233		**m2**	**Acres (Existing)**	**Acres (New)**	**County**	**Developer**	
2+430	3+330	631430	156.026		$ 562,771		
2+040	2+430	295779	73.087		$ 263,617		
	2+430	14208	3.511		$ 12,663		Robinhood
	1+690	5267	1.301		$ 4,694		MR
1+690	2+040	306348		75.699		$ 273,037	New
1+220	1+690	263940		65.220		$ 235,240	New
	1+690	42664	10.542		$ 38,025		MR
	1+220	7203	1.780		$ 6,420		ATCO
0+820	1+220	313235	77.400		$ 279,175		
0	0+820	610702	150.904		$ 544,297		
East of Range Road 233							
2+430	3+330	640922	158.372		$ 571,231		
1+690	2+430	639844		158.105		$ 570,270	New
0+820	1+690	624514	154.317		$ 556,607		
0	0+820	639485	158.017		$ 569,950		
TOTAL		**5035541**	**945.259**	**299.024**	**$3,409,450**	**$1,078,547**	
			Total Area	**1244.282**			
Cost of Road Improvement			$4,488,000				
Levy Unit Cost per		$ 0.89	$ 3,607				

		Area			Levy Paid By		
West of Range Road 232		m2	Acres		County	Developer	
2+435	3+335	641723	158.570		$ 543,053		
1+635	2+435	639174	157.940		$ 540,896		
0+825	1+635	643609	159.036		$ 544,649		
0	0+825	634662	156.825		$ 537,077		
East of Range Road 232							
2+435	3+335	635842	157.117		$ 538,076		
1+635	2+435	627993	155.177		$ 531,434		
0+825	1+635	627944	155.165		$ 531,392		
0	0+825	633889	156.634		$ 536,423		
TOTAL		**5084836**	**1256.463**		**$4,303,000**	**$ -**	
Cost of Road Improvement			$4,303,000				
Levy Unit Cost per		$ 0.85	$ 3,424.69				

		Area			Levy Paid By		
West of Range Road 231		m2	Acres		County	Developer	
2+440	3+230	633006	156.416		$ 407,705		
1+630	2+440	631355	156.008		$ 406,642		
0+830	1+630	631605	156.070		$ 406,803		
0	0+830	619360	153.044		$ 398,916		
East of Range Road 231							
1+630	3+230	1281299	316.609		$ 825,257		
0+830	1+630	650247	160.676		$ 418,810		
0	0+830	639468	158.013		$ 411,867		
TOTAL		**5086340**	**1256.835**		**$3,276,000**	**$ -**	
Cost of Road Improvement			$3,276,000				
Levy Unit Cost per		$ 0.64	$ 2,606.55				



FUTURE DEVELOPMENT

EXISTING DEVELOPMENT

0 500 1000m

SCALE

APPENDIX I

FUNCTIONAL PLANNING STUDY
RANGE ROAD 231
PRELIMINARY AREAS FOR LEVY CALCULATION

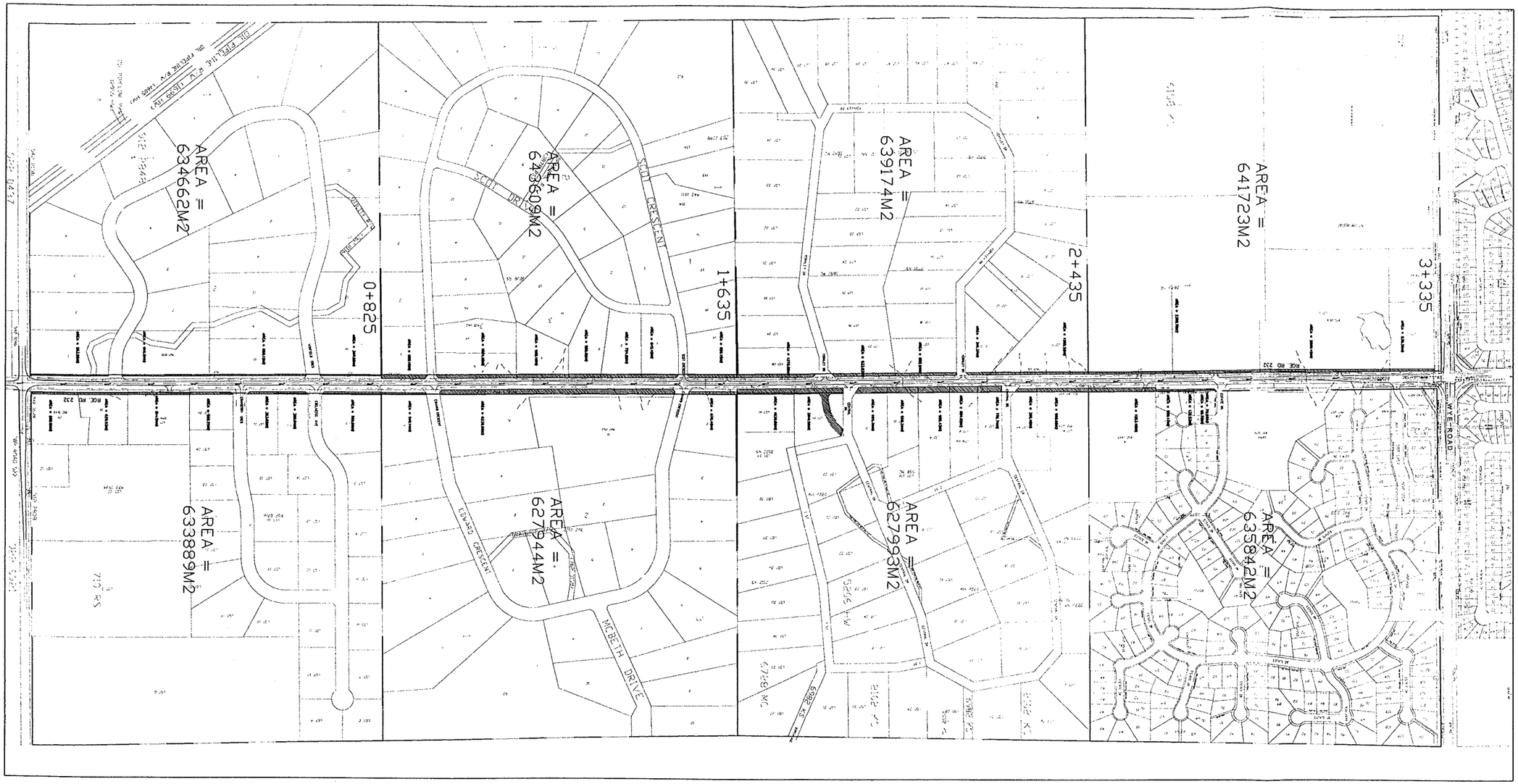
Strathcona County

EARTH TECH

FILE 57257

DRAWN BY

DATE JANUARY 2004



FUTURE DEVELOPMENT

EXISTING DEVELOPMENT

0 590 1000m

SCALE

APPENDIX I

FUNCTIONAL PLANNING STUDY
RANGE ROAD 232
PRELIMINARY AREAS FOR LEVY CALCULATION

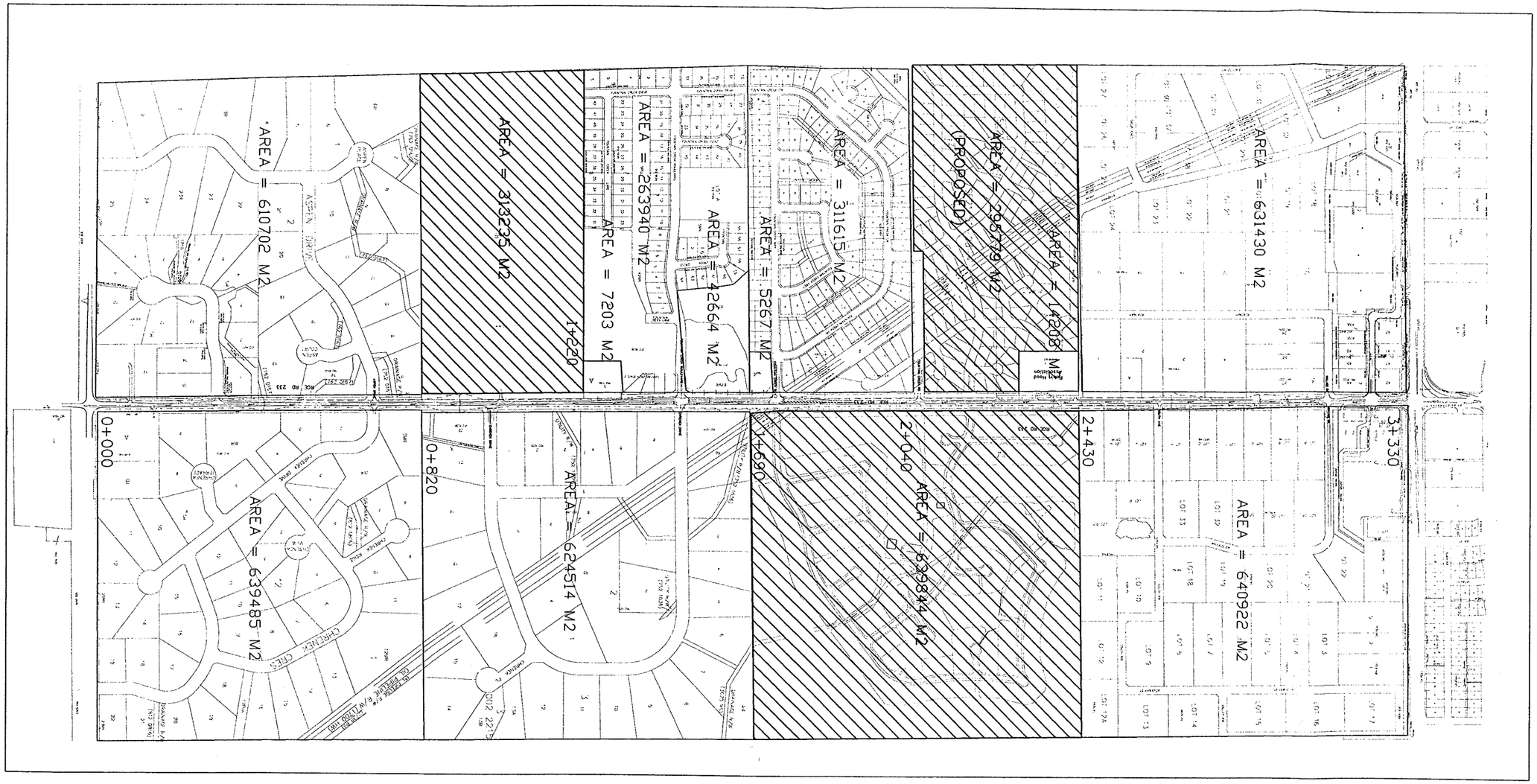
Strathcona County

EARTH TECH

DRAWN BY

FILE 57257

DATE JANUARY 2004


NORTH
AREA = 631430 M2
AREA = 14208 M2
AREA = 29579 M2
(PROPOSED)
AREA = 5267 M2
AREA = 311615 M2
AREA = 42664 M2
AREA = 263940 M2
AREA = 7203 M2
AREA = 313235 M2
AREA = 610702 M2
AREA = 639485 M2
AREA = 624514 M2
AREA = 539844 M2
AREA = 640922 M2
0+000
0+820
1+690
1+220
2+040
2+430
3+330
RGE RD 233
CHARLOCK CRES
CHARLOCK PLACE
CHARLOCK WAY
CHARLOCK CRT
CHARLOCK CRES

APPENDIX L

PUBLIC CONSULTATION

Range Roads 231, 232 and 233, from Highway 628 to Wye Road

FUNCTIONAL PLANNING STUDY

Project Information Sheet (October 2002)

Project Background

Strathcona County is experiencing significant development and growth which could impact Range Roads 231, 232 and 233. Earth Tech (Canada) Inc. has been retained by Strathcona County to conduct a Functional Planning Study of RR 231, 232 and 233, from Highway 628 to Wye Road to determine future requirements for these roadways.

Project Objectives

The objectives of this project are to:

- Identify upgrading needs to rectify any existing problems, to accommodate future growth, and to manage access
- Ensure compatibility with provincial plans for Hwy 628 (Twp Rd 522)
- Identify a recommended cross-section, urban or rural, for the roadways should there be a need to change their configuration in future.
- Identify stormwater management requirements for each of the roadway corridors
- Identify how pedestrians and other trail users will be accommodated along the upgraded roadways
- Identify any noise attenuation requirements for each of the roadways
- Identify right-of-way requirements to accommodate the recommended roadway improvements with all related elements such as drainage, utilities, pedestrian facilities and noise attenuation facilities
- Identify an implementations strategy based on the priority of the recommended improvements

Key Study Issues

Traffic Growth
Future increases in traffic will be estimated in order to help determine required roadway and intersection configurations.

Utilities
Existing and future utilities in and around the road right of way will be reviewed to determine their influence on of future roadway changes.

Roadway Alignment
Future roadway upgrading may entail widening to one, or both sides of the existing alignments. Property, and/or other constraints, such as utilities or bodies of water, may influence alignment choices and selection.

Access Management
There are currently numerous accesses onto RR 231, 232 and 233, between Hwy 628 and Wye Road. The effect of these accesses on the operation and safety of the roadway is of concern. There will be a need to consider access management schemes for locations that either merit consolidation of existing accesses, or that may be susceptible to development and access pressure in the future.

Intersection Configuration
Alternative intersection configurations may need to be considered at a number of locations, to address traffic flow, access and safety.

Stormwater Management
Proper management of stormwater resulting from any changes to the existing roadways will be addressed as part of this study.

Pedestrian Circulation
Pedestrian circulation along and across the roadway is an issue of concern that will be investigated and assessed in this study.

Traffic Noise
Traffic noise is an issue of concern that will be assessed as part of this study.

Safety
The safety of the existing roadways and any future changes will be assessed during the course of this study. This includes travel speed, speed limits and any roadway or natural features that may influence safety.

Preliminary Improvement Strategies

Overview

A number of strategies to address existing and future roadway deficiencies will be considered as part of this study. It is too early in the study to determine which of these strategies and at what locations they will be pursued. However, the possibilities are described below in order to convey the range of options that may be considered as the study progresses.

Intersection Improvements

At the present time, there are only a limited number of turning lanes on the range roads at subdivision accesses. To improve the safety and operation of these intersections, it may be appropriate to introduce turning lanes on some or all of the intersection approaches.

Access Management

In addition to a number of subdivision access roads that connect with the range roads there are a number of individual access driveways that also exist. To improve safety and traffic operation, it may be appropriate to relocate the access point to improve the spacing between them or to consolidate them into a single point of access.

Speed Management

Operating speeds along the range roads may not be consistent with the original roadway designs. If speeds are found to exceed the design parameters of the roadways, either roadway geometry will need to be improved, or speed limits will need to be adjusted.

Roadway Widening Options

Should future traffic conditions warrant, consideration may need to be given to widening some or all of the range roads under consideration. Any potential widening would entail widening from the existing two lanes to four lanes; intersection improvements would also be undertaken as part of such widening.

If widening is needed, a number of widening options may be considered. This includes the addition of one lane in each direction, plus the installation of a raised center median. The upgraded roadways may have a drainage ditch along each side, or they may have curbs on the outside edges to eliminate the space needed for ditches.

Your Role in the Project

Please share your thoughts with us on how the project affects you and your community, and on how to make the project a success, by:

☑ **Completing a Questionnaire**

☑ **Contacting the Project Manager:**

Hassan Shaheen, P.Eng.
Earth Tech (Canada) Inc.
17203 – 103 Avenue
Edmonton, Alberta T5S 1J4
Phone: (780) 488-6800
Fax: (780) 488-2121

Strathcona County

EARTH TECH
A tyco INTERNATIONAL LTD COMPANY

Range Roads 231, 232 and 233, from Highway 628 to Wye Road
FUNCTIONAL PLANNING STUDY
Open House Questionnaire SUMMARY – October 2, 2002

Attendance Sign-in: 119; **Actual Attendance:** 160

Questionnaires Returned: 89

Deadline: October 9, 2002

Classification: 81 "residents of the study area"; 41 "employed in Strathcona County"; 23 "employed in Edmonton"; and 33 "travel through the area on a regular basis"; 7 "other".

(Note: The number of responses exceeds the number of questionnaires returned due to the respondents choosing more than one applicable option)

Length of Residence – Of 82 respondents: 4 "resident of the study area for less than one year"; 53 "over five years"; 24 "one to five years"; 1 "not a resident of the study area".

FEEDBACK ON KEY ISSUES:

1) **Effects of Traffic Growth on the Range Roads** – Of 85 respondents: 49.4% and 29.4% "extremely concerned", and "very concerned"; 12% "concerned"; and 7.1% "somewhat concerned"; 2.4% "not at all concerned".
2) **Location of Existing Highway Intersections** – Of 84 respondents: 33.3% "extremely concerned"; 23.8% "very concerned"; 20.2% "concerned"; 9.5% "somewhat concerned"; 13.1% "not at all concerned".
3) **Operation of the Intersections** – Of 86 respondents: 41.9% "extremely concerned"; 30.2% "very concerned"; 16.2% "concerned"; 5.8% "somewhat concerned"; 5.8% "not at all concerned".
4) **Accommodation of Pedestrians** – Of 86 respondents: 37.2% "extremely concerned"; 23.3% "very concerned"; 18.6% "concerned"; 15.1% "somewhat concerned"; 5.8% "not at all concerned".
5) **Presence/Location/Configuration of Accesses** – Of 82 respondents: 42.7% "extremely concerned"; 23.1% "very concerned"; 20.7% "concerned"; 6.1% "somewhat concerned"; 7.3% "not at all concerned".
6) **Impact of Access Changes on Residents and Businesses** – Of 85 respondents: 50.6% "extremely concerned"; 23.5% "very concerned"; 15.3% "concerned"; 8.2% "somewhat concerned"; 2.4% "not at all concerned".
7) **Travel Speed on the Range Roads** – Of 86 respondents: 47.7% "extremely concerned"; 14.0% "very concerned"; 18.6% "concerned"; 12.8% "somewhat concerned"; 7.0% "not at all concerned".
8) **Speed Limits** – Of 83 respondents: 42.2% "extremely concerned"; 18.1% "very concerned"; 12.0% "concerned"; 13.3% "somewhat concerned"; 14.5% "not at all concerned".

FEEDBACK ON PRELIMINARY CONCEPTS:

1) **Intersection Improvements** – Of 72 respondents: 47.2% "fully support"; 27.7% "mostly support"; 11.1% "somewhat support the issue"; 2.8% "do not support"; 11.1% "don't know".
2) **Access Management** – Of 61 respondents: 36.1% "fully support"; 23.0% "mostly support"; 14.3% "somewhat support"; 8.2% "do not support"; 18.0% "don't know".
3) **Roadway Widening** – Of 75 respondents: 21.3% "fully support"; 17.3% "mostly support"; 26.7% "somewhat support"; 32.0% "do not support"; 2.7% "don't know".
4) **Speed Management** – Of 68 respondents: 50% "fully support"; 19.1% "mostly support"; 14.7% "somewhat support"; 5.9% "do not support"; 10.3% "don't know".

Range Roads 231, 232 and 233, from Highway 628 to Wye Road
FUNCTIONAL PLANNING STUDY
Open House Questionnaire SUMMARY – October 2, 2002

The project team for the Range Roads 231, 232 and 233, from Highway 628 to Wye Road Functional Planning Study held its first Open House on October 2, 2002, in Sherwood Park's Festival Place facility. Local residents were alerted to the event through a mail out to property owners, and an advertisement in the two local newspapers (Friday, September 20 in the Strathcona County This Week; and Wednesday, September 25 in the Sherwood Park News). One hundred and nineteen people signed in at the event, but true attendance was approximately 160.

A number of information panels and drawings were created to supply basic project information, modeled after the details provided in the Project Information Sheet handout. The displays supplemented the information provided by the four project technical representatives, who circulated throughout the room. All attendees were given a detailed questionnaire and were encouraged to fill it out and return it before leaving the event. Some of these were completed and returned after the open house; the deadline to do so was October 9, 2002. In total, 90 questionnaires were returned. The input gathered through these documents is summarized in the following sections, in the order the questions appeared on the sheet:

1. Are you responding to this questionnaire as:

An Individual	Representative of Group or Organization
86	4*

***Name of Group or Organization:**
- Sherwood Park golf course
- A family
- Ingrid Larsen & John Danielsen
- Citizens Action Committee regarding 628 is formed and moving into action.

2. Type of interest (as many as applicable):

Resident of study area	82
Resident of Strathcona County	42
Employed in Strathcona County	5
Employed in Edmonton	23
Travel through the area on a regular basis	33
Other	7*

***Other:**
- Live on RR 233 & TWP Rd 552
- Own the golf course on RR 233
- Retired (x2)
- Future resident of area (x2)
- Property backs onto RR 231
- My residence is located adjacent to RR 231

3. The project team has compiled an initial list of transportation-related issues from its background work. Please rate your level of concern for each of the following issues:

	Not at all Concerned	Somewhat Concerned	Concerned	Very Concerned	Extremely Concerned
a) Effects of Traffic Growth on Range Roads	2	6	10	25	43
b) Location of existing highway intersections	11	8	17	20	29
c) Operation of the Intersections	5	5	15	26	36
d) Accommodation of Pedestrians	5	13	16	20	33
e) Presence/location/configuration of Accesses	6	5	17	19	36
f) Impact of access changes on residents and businesses	2	7	13	20	44
g) Travel speed on Range Roads	6	11	16	12	42
h) Speed Limits	12	11	10	15	36

Comments:

- Noise – extremely concerned.
- Where would speed limits be?
- Accommodation of roads for recreational purposes such as for walking & cycling. Extremely concerned with the danger that exists. If people would be responsible drivers I wouldn't be so concerned but the range roads are, increasingly, being used as a speedway.
- When we first moved into our home, we used to ride our bikes down 233 to D.Q. for dessert with our small children. I am afraid to drive this road now let alone walk or ride a bike.
- SBD traffic.
- Bike trails/paths should be part of immediate concerns. Bikes currently travelling on RR 233 are at risk, especially when there is traffic on both sides of road.
- Time frame - when will we get dates of implementation of these changes.
- Speed limit should be lowered to 80 km from Highway 14 - 16.
- Truck routes and noise are big concern - wetland preservation.
- With the additional traffic on range roads and 628, it is increasingly important to provide pedestrian/bike trail/access along range roads and/or between subdivisions.
- Wye Road Gardens needs another access not on to (besides) RR 233. Could be put in behind Canadian Tire to Ordze Park.
- I think we need left turn lanes and right turn lanes at some entrances off RR 232. It would be good to have a sidewalk on RR 232 which would be good for pedestrians and bicycles.
- Accommodation of pedestrians and cyclists. Left turn (off 232 onto Wye Road) ok with arrow; poor sight lines, cannot see southbound traffic.
- We live in the Estates of Sherwood Park close to RR 232. When we moved to this subdivision there was almost no traffic on 232. Now you have sometimes a hard time to get out of the subdivision. The traffic noise is pretty bad since we can also hear the Wye Road traffic. Pollution is an everyday occurrence as well. The speed limits posted are o.k., however, they are being ignored by most motorists, i.e., they never go 60 km/hr when they should.
- Concern *re:* intersections at 522 at 231, 232, & 233 – will intersection improvements be tied to the provincial project of upgrading 522. The County may need to move ahead with these improvements without the support of the Province. They may not do 522 for up to 10 years.
- There must be more public input requested, not silly questionnaires.
- Dangerous at the RR intersections in morning & evening Need better (safer) access to TWP roads. Pedestrians & bikes need some way, bike or pedestrian paths, to tie into Sherwood Park. There are no pedestrian accommodations presently. You take your life in your hands.

- If someone walks on the RR or TWP roads they are taking their life in their hands. We are concerned about the safety when turning off main roads onto our property.
- *Re:* RR 232 to Whitemud extension intersection: When extension was initially upgraded and stop signs changed to throughway for the extensions, my husband missed being killed by inches when a car went through on the RR southbound. A phone call to the County gave the response that a good sized sign was being installed. I have appreciated the highlights being there now at least.
- We need bicycle and pedestrian paths on RR 232 – traffic too close to cyclist. We need turning light at Wye Rd and RR 232 – advance turn on south from heading west.
- Highway 232 will definitely have to consider turning lanes/passing lanes. We used to walk RR 232. Today few of us venture out onto the road. Concerns – "narrow" roadway without shoulders; speed limits are realistic but speed is a problem; visibility (small hills) that is short at the high speed; numerous approaches from private property where people do not stop; drivers "crawling out" into a line of traffic that is travelling fast; turns off 232 into developments.
- As a walker/biker who frequents RR 233 I have been almost hit at least three times when travelling at night. Even with a stride-light around me cars still come way too close. No accommodations have been made to ensure the safety of pedestrians/bikers even though it must have been foreseen that the changes regarding 233 would result in a huge increase in traffic.
- Live on RR 233. Speed limit is too high, as no one even follows the 80 km/h. People have passed going 100+ km/h. Kids have bikes on this road – an accident is waiting to happen. No policing at all. Animals/environment also a concern. This road should be residential access, not used as a throughway.
- I find speed limits on County roads very good. The speed limit on Highway 21 between Highway 14 and 16 is totally ridiculous – it should be down to 80 km.
- Speed limits should be reduced, 60 kph on all 3 range roads 231, 232, 233.
- 1) Local trucks only (especially RR 233); 2) Lower and control speed because of all residential access; 3) ensure twinned Hwy 14 takes more of this traffic.
- A major concern for my wife and I is the 100 km speed limit on Hwy 21 between Hwy 14 & Hwy 16 - is extremely dangerous. The speed limit should be dropped to 80 km. I want the County to deal with the issue with Alberta Infrastructure for the safety of its residents.
- 1) Wye Road & RR 233 intersection and the close proximity of the Wal-Mart/Wendy's intersection is extremely dangerous; 2) RR 233 and 628 intersection is also a high volume dangerous intersection.
- Increased volume on RR 232 will make it more difficult to get on 232 from our subdivision. There is no place for bicycles on the range roads. Concerned about riding my bike. Bike paths would be appreciated. Need turning signal on Wye Rd if turning south when going west.
- Increased traffic noise is a major concern. Building berms or noise barrier should be considered adjacent to homes that are in close proximity to roads.
- 1) People speed on all 3 of the subject roads. As well they pass when it is unsafe to do so especially when somebody is slowing down to turn into an acreage subdivision; 2) There should be traffic lights at each of the intersections of 231, 232 & 233 with the old TWP Rd 522, the new Highway 628 as there have been a number of serious accidents at those intersections.
- Traffic volume on RRs has increased to the hazard point with access from 628 for residents of Sherwood Park. Speed limit should be lowered to 60 km for safety of residents & cyclists.
- I feel that instead of upgrading range roads the County should concentrate on upgrading highways and reducing traffic on range roads.
- Safety on range roads is a huge concern as these are narrow country roads that are now handling more traffic than they were designed for and they do no have proper turning lanes or width at present.
- Aspen Heights needs a second access- we suggest through reserve land into Victoria Park Estates. Close existing exit onto 628. Absorbant sound barrier from Hwy 14 to Hwy 21 along 628 on north side.
- We turn left out of Apen Heights to go to work each day and it is difficult (occasionally) not only because of the volume of the traffic on 233 in the AM but also because of the speed. Turning onto Aspen Hts., even the right hand turn is exciting because cars behind you travel fast and frequently come right up to your bumper before you turn.
- Clear distinction must be made what the Range Roads are going to be: thoroughfares like Wyr Road, Hgh.way 628 or 21, or local roads serving residential area. If they are local roads, block them in the middle to prevent through traffic instead of widening.

- I think existing speed limits are fine, but am concerned about high traffic volume on the Whitemud extension making it somewhat difficult to cross in safety.
- A bike trail or pedestrian walk should be included from out subdivision through to Sherwood Park along RR 233.
- Reduce speed limit to 60 KPH.
- We would like to see our subdivision have only the one entrance by the mail boxes, knowing that the south entrance must be closed.
- Live on Range Road 233 – very concerned with speed of traffic. Commuters continuously travel faster than the 80-km/h speed limit. Should be lowered and do not allow any passing on the road. This road should be used as access for residents only, as much as possible. One way of doing this (Cost effectively) is lower the speed limit.
- My main concern, as a mother of young children is the lack of a trail or 'sidewalk' along these roads. I, myself, feel safe walking/biking/blading, but don't feel the shoulder is suitable for young children to do these activities.
- Aren't (G) and (H) the same thing? A) I don't want RR232 to become a super-highway. I like it as it is!; B) There are only 2 main intersections, north end (Wye Rd) and south end (Twp Rd 522); C) The intersection at Twp 522 might need some changes. I'm told that in the morning rush hours, it is very difficult for N-S travelers or people turning from 232 because of the constant stream of 80km/h vehicles on 522 (north end at Wye Rd already have traffic lights). D) A bicycle/pram/walking path off the road would be very nice; (G) and (H) Maybe speed limit should be lowered to 70 or even 60.
- All of the above, concern the safety of county residents and require action asap.

4. After reviewing the displays and handouts, please comment on the *features* of the Preliminary Concepts below.

Please mark the ONE response that best reflects your OVERALL view for each topic:	Fully Support	Mostly Support	Somewhat Support	Do Not Support	Don't Know
a) Intersection Improvements	35	20	8	2	8
b) Access Management	23	14	9	5	11
c) Roadway Widening	16	13	20	25	2
d) Speed Management	34	13	10	5	7

Comments *re:* Intersection Improvements:

- I would really like to see at the main intersections a right turn & left turn lane.
- On 231 turning lanes are needed on Sconadale Road. On 628 left & right turning lanes are required to decrease loss of lives.
- I cannot support this until the County comes up with an actual proposal.
- Every main intersection on RR 223 should have a turn lane and exit lane added. You could close some subdivision roads to cut down the costs of this.
- Turning lanes – left & right – very important.
- See comments above (I think we need left turn lanes and right turn lanes at some entrances off RR 232. It would be good to have a sidewalk on RR 232 which would be good for pedestrians and bicycles).
- Have to provide left/right turn lanes and/or lights.
- Didn't necessarily understand them.
- Critical!
- Give us your specific recommendations for each intersection. Then and only then can we intelligently comment.
- Safety is big concern – maybe four-way stops?
- I strongly support lighting the range roads, at least the intersections with all residential access roads should be illuminated adequately.
- Advance turning light especially at peek traffic.

- These improvements must come into approaches to roadways, acreage developments and private approaches.
- The intersection of 231 and the south entrance of Windsor Estates is poorly designed. The uphill grade from the subdivision onto 231 is very hazardous when trying to turn north onto 231 only to be compounded by lack of sight because of the hill on 231. Icy road conditions & speed also are concerns when trying to make a turn north onto 231.
- I asked if there was increased traffic on 522 east of Hwy 14. I was told this had not been done. Why are we here?
- But in conjunction, the speed limit has to be changed. Doesn't do a thing for making a left hand turn on RR 233 out of any subdivision.
- I fully understand that as the County grows planning will always have to keep up and it's good to see future planning (as a resident).
- I would like to see turn lanes and lights at the intersections 233, 232, & 231.
- Nothing concrete to support – multiple designs presented.
- Very concerned as we live on 231 and 522.
- If you leave the range roads alone and reroute traffic to the highways there will be no problems with the intersections.
- Need more information regarding land requirements for expansion of road.
- Not enough information provided as yet to answer.
- Didn't see any preliminary concepts just areas affected and issues to be addressed.
- Campbelltown Heights is currently bottled up from 3:30 to 6:00 p.m. (Cannot have a left turn onto Wye Road at Hawthorn) nor conveniently address the mess at Wal-Mart/Home Hardware. Pedestrian cross walk at Hawthorn is completely ignored by Wye traffic.
- The acceleration/deceleration lanes at Fountain Creek Phase II was a great benefit. These are a must at all intersections.
- Traffic lights on RR 233 and #628.
- Install lights at RR 233 and Twp Rd 522 – impossible to cross 522 in peak times – Wye Rd and RR 233 no idea – hell of a mess!
- I felt the intersection info was insufficient to make an informed decision.
- 1) Remove cameras terrorizing drivers; 2) Remove commercial signs crowding traffic signs; 3) Check traffic signs for clarity, remove non-regulation signs.
- We did not see a representation of a preliminary concept plan, but a variety of possible intersections. Obviously there must be a plan in place. Why not present it?
- Again we don't want extra roads into subdivision. We want existing road kept onto RR 233.
- Fine if speed limit is lowered.
- I support the suggestions for improvements to the intersection of 232 and 522. It might need a traffic light.
- I was not in attendance at open house so 4(a) to 4(d) is N/A.

Comments *re:* Access Management

- I think moving some of the accesses would be a very big improvement. For the ones that can't be moved, turn lanes are the only option.
- See above (I cannot support this until the County comes up with an actual proposal).
- We would suggest limited access to the range roads.
- My property does not lend itself to access to subdivision.
- Keep good access on to the road systems from the residences.
- Need traffic lights at Wye Rd Gardens & RR 233.
- See comments above (I think we need left turn lanes and right turn lanes at some entrances off RR 232. It would be good to have a sidewalk on RR 232 which would be good for pedestrians and bicycles).
- We need to see specific recommendations (in order to intelligently comment).
- It wouldn't hurt to have turn lanes.
- Our present driveway is off the range road and we have no access to the acreage entrances. In winter I have a big problem getting onto the range road.
- No closure of entrances from subdivision accesses – private driveways could be diverted to within subdivision.
- Don't understand the displays, no real best scenario proposed.
- I'm unclear if the access management is for the 231, 232, 233 or subdivisions. I would like to see more turn lanes into subdivisions.

- Access management needed, however, there is a need for two entrances/exits for all subdivisions (safety issue).
- 1) Lights required at Hawthorne; 2) Synchronize lights at Fir Street & Wye on Sherwood Drive/233.
- Close public access to the main road but do not close one of the accesses from subdivision to range road.
- Not enough information provided to answer.
- What effect on wildlife & habitat.
- Important as to how and where we have access into our subdivision.
- Not happy, but will accept closure of Aspen Hts. onto #628 with sound berm placed where existing road exits.
- I felt the Access Management info was insufficient to make an informed decision.
- In our area (RR 232) access has not been a problem.
- We do not want the access to Aspen Heights going past our house through to Fountain Creek. We agree to only one access to Aspen Heights and that being the existing access on to RR 233. Right and left turns should be allowed onto 344 from our subdivisions.
- Again no proposal was presented. Showing various intersection exchanges, but not showing actual plans is wrong.
- Access is fine if speed limit is lowered – this will reduce traffic on the roads.
- Access along the road (232) for the subdivisions is alright as it is – at least for the present. Lowering the speed limit might be useful (although, so far as I know, there haven't been any accidents at any of the subdivision turn-offs).

Comments *re:* Roadway Widening

- I support (four lane) the concept of either a left turn (turning lane) or the median concept. The left turn would be cheaper, I think, than the median concept. The four lane without a left turn lane is the least acceptable to me as I think this leaves us with the most dangerous option.
- Needs to be 4-lane divided in order to handle traffic & enhance safety. There needs to be traffic lights out of each of the subdivisions.
- Support only slight widening & a bike path. NO 4 lanes!
- DO NOT support widening on 231.
- Road widening will only bring more traffic into the area. It is supposed to be RURAL Strathcona County not urban. It is already difficult and dangerous turning in and out of subdivisions along these roads without more traffic to contend with.
- Needs wider shoulder. Very important.
- Most of the people travelling on these range roads are using them as a shortcut to Wye Road and 628.
- If there is going to be road widening I would like it on 233. I also think this would be the least disruptive to area residents. It also goes by the County shop which has a high volume of traffic.
- Do not see any allowance for bike paths.
- Hopefully not at this time.
- Would be a good idea to widen to allow bikes & walkers to enjoy safety.
- Do not want 231 to become major roadway. Extremely concerned.
- There's already enough road noise without making it a highway!!
- The proposed rights of way appear excessive for the road width.
- If it means that cars will be able to drive faster – no – but give us specific recommendation we can respond to.
- Need to have wider shoulders, some are small & some don't exist.
- Wider shoulder on roadway.
- Yes, for safety, but would land for shoulders be widened and land taken from the fronts of acreages?
- While I realize it is a necessary evil especially as pedestrian traffic needs to be accommodated, I feel for the people whose property will be affected.
- Noise will increase, traffic will increase.
- Traffic flow will increase dramatically, making the road more dangerous. Speed limits will increase. This is not a highway. What happened to people that don't live around the area using Hwy 21 & 14.
- This should be used as residential access only. People can use Highway 14 or 21 for throughways. Would people like it if we drove 20+ km/h over the speed limit in their neighborhood?
- I agree with widening roads if necessary, but a lot can be done in some areas with turning lanes.
- Limit amount of trucks and traffic.

- Due to the expected access closures from the subdivisions I think some roads like Sconadale need to be widened & improved.
- What is the demand for road widening? How about the contour of existing road, specifically hill on 231?
- With left turn lanes and right turn lane and one lane through.
- I can support a 4-lane curb & median with drains on 233. I do not want to see the natural beauty of trees removed from Wal-Mart to golf course entrance and beyond. A walkway is important, but away from the road if possible.
- Only if future traffic conditions required it.
- If daily volume warrants.
- Residents on 233 will be concerned with the loss of frontage/increased traffic. Study must include rezoning to allow the (illegible) residents the option of selling without losing their shirts on decreased property values.
- Hwy 21 should be twinned and all freeway traffic off Whitemud should be encouraged to use #21 if possible.
- Residents close to affected roadways will face losing so much property their enjoyment of rural life will decrease to the point where they are forced to sell resulting – lost value of property – exodus of rural residents opening area to more commercial use.
- The roads do not need to be widened except at the intersection to add a turning lane. As well, the shoulders should be widened so that pedestrians are safe on the roads.
- Definite NO. Widen Highway #21 – that's where the growth will be. Widen #14. Keep 232/231/233 for local traffic only.
- If you turn all the roads into main thoroughfares why do you need highways.
- As a residents of Chrenek Acres I do understand and support road widening <u>BUT</u> the noise factor to the residents has to be a factor.
- Turning lanes from RR into subdivisions.
- Street lights where subdivisions exit onto RR.
- The 40' right of way at the north end of Range Rd 233 would be adequate (a distance of approx 1 km)
- Sidewalk installed on one side of road only.
- Keep as narrow so I don't lose my trees and any more property.
- The information provided is interesting however the process of preference was not clear enough to make an informed decision.
- RR 231, 232 and 233 should serve the local areas and feed traffic into Hwy 628, 14, 21 and Wye Road. They should be blocked for the through traffic.
- I fully support widening Whitemud extension, but only partially support widening of RR's.
- Widening roadways will invite more traffic.
- What is the proposal?
- Keep road as is: lower speed limit. Kids use road for biking – an accident is waiting to happen. Animals/pets are being killed. Lower the speed limits, no passing.
- More traffic but what about noise and the possibility of moving some residents. There must be other ways.
- The roads should only be widened at the south end. For 232, it has already been widened at Wye Rd. This intersection seems to be working all right at the moment.

Comments *re:* Speed Management

- The speed on the range roads should be kept at 80 kph. People live here and these were not meant to be highways or speedways.
- Speed limit should be reduced and enforced! Easy & cheap for the County (if implemented properly it will also reduce noise and safety concern). Large trucks should not be allowed on these roads.
- DECREASE speed on 231 to 60. Limits are NOT enforced & many reach 100 km! It is too fast, dangerous & noisy.
- I live on 233. It has a dotted line down most of the road. The speed limit is 80. COUNTLESS times I have turned north out of my subdivision and come bumper to bumper with a south bound vehicle passing another vehicle. The road has too many entrances to have a dotted line and too much traffic to have the speed at 80. It should be 60.
- 80 km is fine if turning lanes were provided.
- Decrease speed limits, perhaps then 80 would be the limit.
- Is okay.
- Too fast -60 km - too many acreage entrances.

- Anything to reduce traffic noise.
- Current speed limits are not enforced.
- Absolutely – but give us something to look at.
- Speed at present is fine.
- 80 km okay.
- Yes.
- I strongly recommend reducing the speed limit on RR 231, 232 & 233 to 60 km/hr for traffic and pedestrian safety.
- Lower speed limit to 60 kph on RR 232.
- RADAR, RADAR, RADAR. Nail "the bastards" and make them pay with money and demerits. "You play – you pay."
- As there is no safety accommodations made for pedestrian traffic, speed will definitely have to be addressed.
- To slow people down not to put photo radar to earn more money.
- Speed limits should be reduced to 60 km. Traffic would decrease and use the faster routes – i.e., highways.
- See earlier comments. (This should be used as residential access only. People can use Highway 14 or 21 for throughways. Would people like it if we drove 20+ km/h over the speed limit in their neighborhood?)
- But it should work both ways. In the past I have seen in the County roads where the posted speed was too low then at a later timer raised,. while in the earlier time the police had a hay day.
- Noise is a concern from high speed.
- Key to safety along residential roads – none at this time is being done.
- We find (on Hwy 628) the traffic is being monitored by RCMP. We would like to see that continued due to the high speed that cars travel at.
- If no access or improved access will speed increase? What are the parameters?
- Depending on what type of sound barriers are going to be constructed will determine speed limits.
- Right now they have a speed limit of 80 km and the average speed is probably 100 km.
- Lower RR 232 to 60 kph from 628 to Wye Rd.
- Maintain as is – restrict to local traffic.
- People can learn to slow down & drive at a reasonable speed (i.e., the speed limit 80 km/hr). Otherwise put the police out there and charge them. Hit the speeders in the pocketbook.
- Areas such as Campbell Town (233) east arm – are now facing increased traffic of people using west entrance as a shortcut to Wye Rd East at speeds sometimes grossly in excess of limit.
- 80 kph should be a minimum – this is possible with road widening and access management.
- I think if turning lanes were provided 80 km may be ok.
- The speed limit may have to be lowered to 70 or 60 km to discourage usage of 233 over Highway 14.
- No more than 80 km on 231, 232, 233 & 628.
- Speed on RR need to be reduced to 60 kmh.
- Did not see any information – lower speed should be implemented to 60 km/hr; 1 ½ km from Wye Road South or for the whole distance to Twp Rd 522 – to discourage some of the traffic.
- Show traffic down. It will help cut the noise.
- Other than the fact that people exceed the posted speed limit on this road, with the number of access to the road, the 80 km limit is too high for the volume and design of the road.
- Speed limits supposed to be advisory not enforced by the law.
- It is vital to decrease speed limit on RR 233 to 60 km/h until proper right and left turning lanes are made.
- Reducing the posted speed should encourage motorists to use the highways rather than the range roads as shortcuts. If nothing else, a reduced speed limit will allows a safer egress from the subdivisions onto the range roads.
- What is the proposal?
- See above (Keep road as is: lower speed limit. Kids use road for biking – an accident is waiting to happen. Animals/pets are being killed. Lower the speed limits, no passing). Lower the speed limit.
- I didn't see anything about speed management. For safety reasons, I would support lowering the speed limit. People live along these roads and in the subdivisions. These are residential areas. At present, the speed limit is the same as on the 4-6 lane Whitemud Freeway!
- See comments #3 (I fully support widening Whitemud extension, but only partially support widening of RR's).

Any additional comments (i.e. on other features of interest to you):

- Highly recommend interconnecting walkways between subdivisions such as exists between Graham Heights & Windsor Estates. This would help to keep local residents off the range roads when using the roads for walking & cycling, especially the children.
- We're concerned that the projected 15-year traffic flow for 233 is extremely low especially considering the possibility of 628 being made 4-lane.
- There are many cyclists on 231. I would support a roadway shoulder for such pedestrians.
- Noise is a great concern.
- 1) Bicycle/walkway trails from Fountain Creek to Sherwood Park; 2) Remove RR 233, 232, 231 as truck routes.
- Safety of the roads must be an important part of the planning.
- Pedestrian/bike traffic is not currently provided. (It should be.)
- The traffic is already far too heavy for the range roads concerned.
- Current speed limit is okay.
- Bicycle path along Wye will be required to tie into paths along 231, 232 & 233.
- WE NEED TO HAVE FASTER ACTION AT PROBLEM AREAS.
- I have a big problem in winter getting onto the range road. Our driveway goes up onto the range road, and with snow my tires spin and I can't get up. If I do I am slow and any coming traffic must slow down for me.
- Need slow down areas and take off areas on RR 232. At present same as for Whitemud with many more accesses.
- I cannot stress enough, as a pedestrian and mother of 4 children who use 233, the immense importance of addressing and providing for pedestrian/biker safety in your final plans. A separate path needs to be put in to allow safe passage to the bike rails north of Wye Road.
- What about a bike path/pedestrian trail alongside the range roads?
- The Province's proposal of adding another access on RR 233, we now hear was not even done in conjunction with the County. (The Province has basically told us it's a done deal. I find it hard to believe the County knew nothing about it.)
- Noise is big issue. Have lived in County for 3 years only. I have noticed a deteriorated quality of life. May as well move back to Edmonton.
- In the very near future I would like to see some plan proposals to contemplate.
- Large truck traffic should be controlled and diverted where possible.
- Find a way to limit truck traffic and speed.
- (Regarding the Preliminary Concepts/diagrams), we didn't see any concepts; haven't a clue what you're talking about.
- A person cannot walk/ride a bicycle east of Hawthorne on Wye, nor on 233, 232, 231, 522. As general traffic is at/exceeding the speed limit – highly dangerous for cyclists & pedestrians.
- Hwy 628 large trucks. They can use Hwy 14 & 15 & 21 & Wye Road. Local trucks only.
- The planting of trees along roadways should be top priority. St. Albert is a good example of trees along roadways. South side of Baseline Road is another good example, but time is a factor in getting mature trees & bushes.
- The only issues we have relate to safety and sound. 1) Safety – The combination of road widening, access management, intersection design should resolve this issue; 2) Sound – If RR 233 is widened it is critical for us that proper berming be put in place. With higher traffic volumes and the type of road surface, sound is becoming an issue. We would expect a berm with trees to help reduce the problem.
- Traffic noise is a major concern (berms/noise walls?). Provision for pedestrians, i.e., bike trail or jogging trail is also a concern.
- Note growth is between 231 & Highway 21. Widen 21. Leave rural streets alone.
- Noise has increased considerably in the last 10 years. Very little "policing" of road, i.e., photo radar.
- Our biggest concern is noise levels and I would expect that our County will go to the wall on making sure that this is well under control.
- Possible closure of one exit from Campbelltown Hts. – i.e., onto 233 east or to Wye Road to the north – pedestrian crosswalk is dangerous – lights at Brentwood & Sherwood Park Drive are not synchronized to allow west bound exit from subdivision without a 2-3 light wait during rush hours.
- I would like to know the long range plans for this area – development and roads (a Secondary Hwy 628 (Twp. Rd. 522) Functional Planning Petition was attached, addressed to Stantec Consulting Ltd.).
- Traffic noise becoming unbearable.

- In the display concerning Hwy 628 by Stantec, the removal of the south exit from Aspen Heights was indicated (that makes sense if it goes 4 lanes) and a second access through Fountain Creek was indicated. Any connection between Aspen Hts. and Fountain Creek does not make sense. An access through Victorian Estates makes more sense!
- We do not need 2 line highways in the residential areas. We need sewers and running water so please put the money for that.
- Speed limit enforcement on range roads is needed now!
- Our main concern is access from RR 232 to Twp Rd 522 (future secondary 628). Currently we use 232 to travel south, east, and west from this intersection. Blocking access would be of great inconvenience.
- Noise is a big issue. We moved to Strathcona County to get away from "city life" 3 years ago things were fine. Now quality of life has deteriorated. Continuous stream of traffic and noise early morning and afternoon commute has really detracted from living in Sherwood Park. May as well move back to Edmonton.
- Residents would appreciate a separated bicycle/walking path. I see joggers, children walking home from school, and mothers pushing strollers. A path would encourage cycling into Sherwood Park, at least in the summer – leave that car at home!
- The present speed posted on 233 in residential area is excessive and places residents in vehicles, and on foot, at risk.

5. The quality of the information displays, background material and basic project information was:

Poor – 1	2	3	4	Excellent - 5
14	17	30	10	2

Comments/suggestions:

- I would like to know more about plans of Alberta Transport (Hwy 21 & 628) if known, & access, lights, etc.
- Displays should be larger – especially intersection improvements. It was very difficult to see what was meant.
- I have a County map at home that has just as much info. There were lots of suggestions as to road widths, etc. but no info as to what some proposals are. Roads were inappropriately labeled. Not very professional.
- No solutions or cost of solutions.
- Too small, too few.
- Could have used a duplicate set of displays on other side of room to reduce congestion.
- No information on 522 upgrades.
- Displays not readily understandable without someone there to explain.
- You have asked me to comment to 4 issues above, yet you don't offer any information that has substance.
- One had to read it all. It would have been nice to have had it all presented verbally as well.
- Larger displays with more use of colors and individual displays for each road would be more appropriate.
- So far no plan. Are you pulling Chretian here – asking what we think, doing own thing anyway.
- Roads were labeled wrong. No clear proposal to agree or disagree with. Not very professional at all.
- Earth Tech was helpful.
- Didn't find much direction as to what this open house was geared for – would be more beneficial if more concrete info presented – not sure if there is a problem, not sure on any of the topics.
- No displays of possibilities for area or ideas for addressing immediately affected homeowners' concerns.
- Considering the magnitude of this proposal I feel that we could and should be much better informed.
- Not enough info provided to answer questions.
- Noticed a number of mistakes regarding labeling of roadways on the displays and information sheets.
- Not any dialogue with consultant, did not (illegible). Seemed a waste of time.
- Larger maps of the areas in question would be helpful in pointing out concerns and visualizing what the final picture may look like.
- No info provided on marginal displays.
- We were unable to attend open house therefore cannot comment on information.
- There were no handouts given other than this questionnaire – they would have been helpful in filling out questionnaire.

- Could not attend the open house, would like mail out of proposed information in future.
- I thought that some of the information provided was interesting but the choices and preferences were inadequately indicated.
- Displays were not easily accessible and I would have preferred someone speaking about changes maybe followed by a Q & A session.
- Present the planned proposal. Representatives at the open house say they do not know what the province has planned. Very aggravating!

6. Notification about the Open House was:

Poor – 1	2	3	4	Excellent - 5
1	2	14	36	20

How did you hear about this event?

Newspaper	15
Mail Out	79
Other	3*

*** Other**
- Another resident
- I heard about it from a neighbor even though I had already seen the ad and subsequently received the mail out.

Comments/suggestions:
- Could have been received a couple days earlier & 4:30 – 9:00 would have been better.
- I now will be notified by mail. Thanks.
- I appreciate your willingness to hear about and listen to our concerns and trust that you will keep us updated as the plans progress.
- Not enough lead-time.
- By neighbor who attended.
- Many people I spoke with were not notified.
- We received the mail out one week prior to the open house, thus not able to plan in advance. I.e. Husband had prior commitment, which could have been pre-arranged by earlier notification.
- Too short notice and somewhat confusing.

7. How long have you been a resident of the study area:

Less than 1 year	4*
Over 5 years	54**
1 – 5 years	24***
Not a resident	1

*Two respondents indicated they are currently constructing homes

**A number of residents indicated the exact number of years they have lived in the study area: 13 years; 35 years; 40 years; 27 years; 27 years; 35 years; 30 years; since 1971; 30 years; over 25 years; 35 years; 32 years

***One respondent indicated he has lived in the area 1-5 years, but has worked in the County for 25 years

Other Comments:

- 1) Develop area (Highway 14 to 21) as residential – rural; 2) Whitemud to #14, then north or south not to #21 to make same choice; 3) need for people/bicycle paths? ***(See attached Diagram #1)***
- There needs to be joint meetings (open houses) with those individuals doing the planning for 628. Residents are now having to give info to 2 different organizations rather than working in a cooperative setting. Why are we not looking at ways to utilize Wye Rd., Hwy 14 & Hwy 21 more effectively & discourage traffic from using 231, 232, & 233??? I know people are avoiding using Hwy 14X to get onto Wye Road because of the high traffic on the Sherwood Park Fwy and the difficulty of getting into the left lane to enter Sherwood Park. Why not look at providing 2 lanes of traffic onto Wye Road into Sherwood Park.
- I find noise to be an issue and it was not a consideration of the questionnaire. Please do not ignore it in your road improvement evaluation. Emphasis – "speed limit", i.e., 17 St. from Whitemud to Baseline is 60- km/hr. Why not 60-70 on these roads. "Safety" was also not there. I notice increased bikers & walkers from Sherwood Park also an important concern.
- The County has not met with the Province yet to find out what their plans are for 522. Our meetings with the Province have led us to believe that they are expropriating land from within our subdivisions to change access off of 522. They have not addressed the RRs at all. As a resident, this is of great concern to me. We live in RURAL Strathcona County and it is very quickly becoming an urban area. Coordination between the County, Province and residents is needed. Noise is greatly increased. A sound barrier is greatly needed along 522. We did not buy property here to have a major truck route and 4 lane highway in our backyard. The County has to take responsibility for their tax paying residents and come up with feasible solutions that address everyone's concerns. Wal-Mart intersection is an accident waiting to happen! This has to be one of the most poorly planned intersections in the County.
- The proposed solution cost & impact analysis would be very beneficial.
- Has there been a study of the traffic on the Whitemud? What are the results? If no study has been done why are we discussing road widening, etc.?
- 1) Turn off lanes at all intersections; 2) making all range roads "non truck routes"; bicycle/walking from Fountain Creek to the Park.
- The information presentation was a complete waste of time & money. The so-called "consultants" had 3 major mistakes naming TWP Rd 522, they called it e.g., Hwy 630, etc. (Besides none of the consulting people were familiar with the area). There were a number of smaller mistakes also. County employees could have done a much better job. By the way there is no TWP Rd 528 as the "consultant" claims. Final comment: A big waste of tax payers money!
- Too congested in the area off RR 233 by Wal-Mart. 3 intersections in a row. Need lights at the Wal-Mart driveway.
- I understand that there is a proposal to extend the current bike trails in the river valley from Devon to Fort Saskatchewan. Does Sherwood Park have a long term plan to hook up with this proposal? Biking is a pleasant & healthy sport/exercise for the entire family. We should, as a community, encourage the expanded use of bike trails whenever possible. I do not enjoy or feel safe biking on RR 233 from SH 628 and Wye.
- With 216 and 21 Highways I see little need at all for widening 233, 232, 231 RRs. There is no need to widen 628 with Hwy 21 so close, traffic controlled by lights would slow vehicle down on 628.
- We want to make sure that whatever happens with 522 works with 231, 232, 233 & vice versa. No point in having a 4 lane dump onto a busy 2 lane.
- I want the rural aspect of the area to remain as is. A pedestrian and bicycle pathway would greatly enhance the safety of the area and encourage people to become more active. Hwy's 21 & 14 are there for moving large numbers of people. Widen and develop them to move people in and out of the area. That's what they are there for.
- Looks like the study was poorly done. Access onto the range roads does not appear to be an issue to Earth Tech as it should be. This open house is a waste of residents' time!
- We would like to see some intersection illumination lighting at acreages. Also separation of pedestrian/cyclists from busy range road traffic. Cemetery requires separate lane.
- I am looking forward to the completion of this study. I feel that it will be positively successful.
- It seems that the process is there to create employment primarily for consultants. We need action. We need to be asked and consulted. The information presented at the public hearing was negligible – we know what needs to be done – over the past several years we have expressed it at various opportunistic occasions. Let's do something – we don't need to study further – we know the problems – fix them. Number one concern is that we need a pedestrian walkway from our subdivision, Chrenek Estates, to Wye Road so that our kids can ride their bikes to school.

- Don't want street lights – interfere with the atmosphere. We left the city to get away from all the lights. Traffic lights at intersections okay.
- We moved into County area to enjoy outdoors. We do not want street lights. It would obstruct view of stars, Northern lights, etc.
- Thanks for considering us in planning preparations for the area.
- I propose reducing the speed limit as an economic first step to reduce noise.
- 1) When working on RR 232, please fix the culvert carrying water from East Whitecroft to West. Since the culvert was changed it was raised up so water does not flow through until our acreage is completely flooded on south section. 2) Synchronize traffic lights within Sherwood Park.
- Growth is inevitable in the County. And with this growth will come expansion that will infringe on communities and developments. Decisions must be made to preserve the history, the environment and the culture of the area. I have listened to many "self-centered" interests and agendas from residents in this area. These should not be considered over the interested of the communities and the needs of growth.
- I don't think we need trails.
- The County needs to address our concerns (we are paying County taxes) over 628, traffic increase, noise, speed limits & access into our subdivision from 628 & RR 233.
- Very disappointed with the way the quality of life has deteriorated due to unmanaged growth. We used to get animals in our back yard but now the traffic & noise has basically forced them away. Safety is a big issue – kids ride their bike, animals are on the road, people walking – an accident will happen Speed – lower to 60 km/h. Let people use Highway 14 & 21 – perhaps we should go speed 20+ km/h in their neighborhood. This study needs to be coordinated with Alberta Transportation 628 SH. They have blinders going on with the (illegible) they don't care as it is "not in their scope". As well, they pretended to listen to people but basically the Province has made up their mind. Owners along the range roads (of which we are in) are going to be severely impacted by widening of the roads. Our property values are going to go down – will our taxes? May as well get that For Sale sign up.
- 1) Poor planning by engineering in road – intersection construction – seems everything is done piece meal; 2) Can't stress enough that limiting truck traffic and speed will solve a lot of these problems; 3) Don't sacrifice country residents over Sherwood Park residents; 4) Study, Study, Study – before approving subdivisions such as Fountain Creek I and II.
- I would like the County to come up with another plan for the residents in Scona Glen subdivision. We won't be able to go onto 628 and go east to get onto Hwy 21 without going 2 ½ miles out of our way. I would like to see signs on 628 "local trucks only". RR 231 appears to be unsafe as far as visibility coming off Sconadale Road. I would like to see exit lanes & thru lanes on the roads so residents can go into their subdivision. This was a rural area for many years. I would like to see it stay rural and redirect traffic to Highway 14 which is already 4 lane divided from Baseline & Wye.
- Didn't appear like there was any coordination with other studies currently in place (Hwy 21 & Hwy 628). No concrete information was given. What are the plans for development within the area of study? They just seemed to project a steady growth, no accommodating higher density. (What about south of 628?) What objective was to be gained from this open house? Not clear or stated. County needs to get a plan and stick with it – for instance was to be no access on Hwy 21 – what about ranch lands with new access on 21?? Would like to see development plan for area before forecasting roadways.
- I would like to see traffic lights at all 3 intersections now not 3-4 years from now. 80 kph max speed limit. More RCMP & County cops watching the stop signs now.
- The projected traffic volume on 233 is too low unless a sincere effort is made to discourage traffic on that road. Something must be done in the area of the median as we come from the south. That is dangerous, especially in the dark.
- I would like to know what the actual plans are for future developments or is this still not certain? I don't like the idea of widening RR 232 as we lost several feet of property years ago when about 15-20 feet of bush was removed on the east side of our property (which was County land I understand) but the noise level has greatly increased since then. Widening the road on west side would increase the noise level of traffic even more.
- Keep the rural roads for local traffic only not thoroughfares. Widen highways. Cut off access to shops from Sherwood Park Freeway to make it a proper and safe thoroughfare. Use service roads for access.
- Improve #21 to 4 lane interchange with 628 and take load of traffic from range roads.

- It is unbelievable that the County wants to turn the range roads into highways when most people that live in these areas moved there for quiet and privacy. If I wanted to live on a highway I would have bought on one. Along 231 the speed limit changes after Sherwood Estates where they only have one access, after the Estates the speed increases as do the road accesses. I feel you should use the highways as highways and the range roads as range roads.
- Our main comments relate to Range Rd 233; it appears our subdivision will lose and entrance now located on Twp Rd 522 and we are agreeable to having only on entrance to Aspen Heights on Range Rd 233. We do not want any other access if it means opening a road going north to Fountain Creek. This is a quiet acreage subdivision and we do not want any traffic from outside the subdivision. As there is likely to be one exit only, we need this to be a left or right turn. Due to the higher traffic volumes on 233 now we would understand widening of the road to 3 lanes, one north, one south and a turning lane to improve safety of turns onto and from 233. Making 233 into a 4 or 5 lane road is not supported by us. We feel we are just 1 mile from Hwy 14 and this road can easily be accommodate traffic going from Sherwood Park to the Whitemud Freeway without any major inconvenience to commuters.
- We have 540' of property backing into 233, and one of the other issues we are concerned about is noise level.
- In general, we are not adverse to further development of the 233 and 628 and appreciate the opportunity to make comments on the process. I believe, however, the county must review the design process of the access locations. In particular, one of the more recent accesses built is at the exit of Fountain Creek Phase II and south portions of the west lane are awkward in the summer when you can see the lane markers and dangerous in the winter when the lane markers are snow covered. Also, the south end of the highway divider at north end of 233 (between WalMArt and Home Hardware) seems too close to the lane widening and I fear that eventually someone will hit that divide (probably during the winter) at high speed.
- If another open house were to be held, I would suggest a speaker knowledgeable of future plans for this area followed by questions from the floor. As the format for tonight's meeting only allowed a vocal few to ask about their immediate concerns. This, in my opinion, does not really enlighten anyone else, as the conversation is not made known to all and those who fielded questions found themselves repeating the same platitudes over and over.
- The access to Aspen Heights from RR 233 should be widening, with an area off road for mailboxes and access to the mailboxes to Chrenyk Acres.
- Obviously, there must be plans for the upgrade of township rd 522 to secondary highways 628. Why not show these plans to us at such a forum? Why not have the province involved in this open house? We do not see the need to upgrade Twp 522. Can traffic flow not be accommodated with current roads 216, 12 and 21? Without adding 628? We would like to see sec. Access to and from RR 232 from the new highway 628.
- Very disappointed in what is happening to quality of life in Strathcona County. Growth is not managed. We all allow all these subdivisions to open, without realizing the impact on existing residents who moved to the "country" for the good life. Quality of life has gone down; taxes have gone up. Where is the value for our dollar? These Range Roads should be used for access to local residents as much as possible. Commuter should use highway 14 and 21, Wye Rd and 628 for commuting. There is no reason why people should be able to travel 80-120 km/h in our backyard. Wye Rd for example is double lane and only 70 km/h. County should listen to the residents impacted, unlike the provincial government and their research study on highway 628. May as well move back to Edmonton.
- Very concerned about additional noise. Can't any of the overflow be diverted to other main roadways? Is there a possibility of a ring road? Subdivisions are going to suffer.
- I have already written too much! Is there going to be another meeting, or a chance to see the final recommendations/plans (after you have gone through all the comments, that is?).
- As an adjacent landowner, my concerns are as follows: 1) First and foremost is the speed of traffic along RR231. The posted speed limit is 60 km/h until just south of the north entrance into Exec. Estates subdivision. The limit is 80 km/h south of that. I walk along this portion of the RR and I am convinces that most of the traffic is going 90 – 100 km/h/ I have also followed some traffic in my car to confirm this. This high speed causes both a safety and noise issue. I believe there should be greater speed control here; 2) My observation is that traffic intensity is only high for about an hour in the morning and an hour late afternoon "going to work" traffic. I question the necessity of widening for this, but if widening is necessary, again I would say that control of speed is urgent; 3) It seems to me the existing road has an unnecessary peak at the "old country buildings". The elevation both to the south and north is significantly lower. This peak causes some sight line restrictions for traffic entering and exiting what is now (illegible) Church. Again a hazard. My suggestions: 1) Monitor the speed; 2) Take out the peak; 3) Add a walking path. Widening is unnecessary, safety first.

Range Roads 231, 232 and 233, from Highway 628 to Wye Road

FUNCTIONAL PLANNING STUDY

Project Information Sheet (November 2002)

Project Background

Strathcona County is experiencing significant development and growth which could impact Range Roads 231, 232 and 233. Earth Tech (Canada) Inc. has been retained by Strathcona County to conduct a Functional Planning Study of RR 231, 232 and 233, from Highway 628 to Wye Road to determine future requirements for these roadways.

Project Objectives

The objectives of this project are to:

- Identify upgrading needs to rectify any existing problems, to accommodate future growth, and to manage access;
- Ensure compatibility with provincial plans for Hwy 628 (Twp Rd 522);
- Identify a recommended cross-section, urban or rural, for the roadways should there be a need to change their configuration in future;
- Identify stormwater management requirements for each of the roadway corridors;
- Identify how pedestrians and other trail users will be accommodated along the upgraded roadways;
- Identify any noise attenuation requirements for each of the roadways;
- Identify right-of-way requirements to accommodate the recommended roadway improvements with all related elements such as drainage, utilities, pedestrian facilities and noise attenuation facilities; and,
- Identify an implementations strategy based on the priority of the recommended improvements.

Preliminary Proposals

Intersection Improvements

- ***Subdivision Entrances***

  A review of existing and future traffic conditions on Range Roads 231, 232, and 233 indicates that wholesale widening of the roadways is not needed in the next 15 years. In order to accommodate expected growth and to address safety concerns, it is proposed that intersections along these range roads be improved through the addition of left turning lanes at existing and future subdivision entrances. Two intersection design alternatives have been generated for consideration. Both alternatives provide capacity improvements at the intersections and enhance safety by providing a separate lane for left turning vehicles.

- ***RR 231 at Sconadale Road/Windsor Drive***

  Due to the gradeline of RR 231 south of this intersection, there are concerns about visibility and safety at this intersection. To address the concerns, a proposed intersection improvement, unique to this location, has been generated for consideration.

- ***RR 233 at Ordze Avenue***

  The intersection of RR 233 and Ordze Avenue is experiencing problems at present, and is expected to do so in future as a result of its proximity to Wye Road, and the extensive commercial development that exists around this intersection. In order to alleviate problems at this location, three alternatives have been developed for consideration. One of the three alternatives would continue to accommodate all movements at the intersection, while the other two alternatives would impose restrictions on certain movements.

Access Changes

There are numerous driveway accesses onto the range roads. The number, locations and spacing of these driveways need to be optimized in the interest of improved safety and operational efficiency of the range roads. Consequently, a number of driveway accesses are proposed to be changed either by relocating or closing them wherever possible.

On RR 233, between Wallace Drive and South Avenue, two alternatives have been generated for reducing the number of direct driveway accesses onto the range road.

Posted and Operating Speeds

Feedback from residents and road users indicates that speeding is a problem along all three range roads, which are currently posted at 80 km/hr. This is corroborated through speed surveys conducted by Strathcona County. In addition to the intersection and access changes discussed above, several alternatives with respect to the posted speed are under consideration. These range from leaving the speed as is, increasing speed enforcement, or lowering the speed limit to 70 km/hr or 60 km/hr.

Pedestrian Circulation

The absence of sidewalks, the presence of narrow shoulders and the high travel speed on the three range roads have generated concerns that pedestrians and cyclists are not properly accommodated at the present time. In response to these concerns, it is proposed that sidewalks be developed along one side of each of the range roads. However, in order to accommodate such sidewalks, it will be necessary to acquire land from adjacent property owners.

Your Role in the Project

Please share your thoughts with us on how the project proposals affect you and your community, and on how the preliminary proposals can be improved to make the project a success, by:

☑ **Completing a Questionnaire**
Available at the project open houses, or upon your request.

☑ **Contacting the Project Manager:**

Hassan Shaheen, P.Eng.
Earth Tech (Canada) Inc.
17203 – 103 Avenue
Edmonton, Alberta T5S 1J4
Phone: (780) 488-6800
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Strathcona County

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Draft as of December 9/02

Range Roads 231, 232 and 233, from Highway 628 to Wye Road
FUNCTIONAL PLANNING STUDY
Open House Questionnaire SUMMARY – November, 2002

Attendance Sign-in: 83; **Actual Attendance:** 106

Questionnaires Returned: 57

Deadline: November 30, 2002

Classification: 53 "residents of the study area"; 8 "employed in Strathcona County"; 11 "employed in Edmonton"; and 24 "travel through the area on a regular basis"; 7 "other".

(Note: The number of responses exceeds the number of questionnaires returned due to the respondents choosing more than one applicable option)

FEEDBACK ON PROJECT PROPOSALS:

Intersection Improvements

1) **Left-turn lanes** – Of 57 respondents: 7.0% "do not support"; 5.3% "somewhat support, but…"; 87.7% "support"; 0.0% "don't know"; 0.0% "not important to me".
   a) **Raised Median Intersection** – Of 50 respondents: 36.0% preferred this alternative.
   b) **Painted Median Intersection** – Of 50 respondents: 64.0% preferred this alternative.

2) **RR 233 and Ordze Road**
   a) **Alternative 1** – Of 49 respondents: 55.1% preferred this alternative.
   b) **Alternative 2** – Of 49 respondents: 18.4% preferred this alternative.
   c) **Alternative 3** – Of 49 respondents: 18.4% preferred this alternative.
   d) **Do not support** – Of 49 respondents: 8.2% preferred this option.

3) **RR 231 and Sconadale/Windsor Drive** – Of 48 respondents: 6.3% "do not support"; 4.2% "somewhat support, but…"; 16.7% "support"; 12.5% "don't know"; 60.4% "not important to me".

Access Changes

1) a) **My driveway is proposed to be changed** – Of 53 respondents: 15.1% chose this option.
   b) **Level of support of access changes** – Of 7 respondents: 42.9% "do not support"; 28.6% "somewhat support, but…"; 28.6% "support"; 0.0% "don't know"; 0.0% "not important to me".

2) a) **My driveway is *NOT* proposed to be changed** – Of 53 respondents: 84.9% chose this option.
   b) **Level of support of access changes** – Of 45 respondents: 8.9% "do not support"; 26.7% "somewhat support, but…"; 40.0% "support"; 4.4% "don't know"; 20.0% "not important to me".

3) **RR 233 near Campbelltown**
   a) **Alternative 1** – Of 48 respondents: 4.2% preferred this alternative.
   b) **Alternative 2** – Of 48 respondents: 29.2% preferred this alternative.
   c) **Neither** – Of 48 respondents: 12.5% chose this option.
   d) **Don't Know** – Of 48respondents: 6.5% chose this option.
   e) **Not Important To Me** – Of 48 respondents: 47.9% chose this option.

Operating Speeds

1) **On the Range Roads**
   a) **Do Nothing, leave Speed Limit at existing 80 km/hr** – Of 57 respondents: 21.1% chose this option.
   b) **Increase Enforcement of Existing 80km/hr Limit**– Of 57 respondents: 22.8% chose this option.
   c) **Lower Speed Limit to 70 km/hr** – Of 57 respondents: 28.1% chose this option.
   d) **Lower Speed Limit to 60 km/hr** – Of 57 respondents: 26.3% chose this option.
   e) **Don't Know** – Of 57 respondents: 1.8% chose this option.

Accommodating Pedestrians

1) **On the Range Roads** – Of 56 respondents: 17.9% "do not support"; 5.4% "somewhat support, but…"; 76.8% "support"; 0.0% "don't know"; 0.0% "not important to me".

RANGE ROADS 231, 232 AND 233
Functional Planning Study
Open House Questionnaire – November 20, 2002

The project team for the Range Roads 231, 232 and 233, from Highway 628 to Wye Road Functional Planning Study held its second Open House on November 20, 2002, in Sherwood Park's Festival Place facility. Local residents were alerted to the event through a mail out to property owners, and an advertisement in one local newspapers (Friday, November 15 in the Strathcona County This Week. Eighty-three people signed in at the event, but true attendance was approximately 106.

A number of project alternatives were created and displayed for the public to comment on. The Project Information Sheet handed out provided a general overview of the alternatives that were being shown. A summary of the feedback received at the first Open House and several information panels were shown to supply project information, modeled after the details from the previous Open House. The displays supplemented the information provided by the five project technical representatives, who circulated throughout the room. All attendees were given a detailed questionnaire and were encouraged to fill it out and return it before leaving the event. Some of these were completed and returned after the open house; the deadline to do so was November 30, 2002. In total, 57 questionnaires were returned. The input gathered through these documents is summarized in the following sections, in the order the questions appeared on the sheet:

Part 1: About You

1. Are you responding to this questionnaire as (please check only one):

An Individual	Representative of Group or Organization
54	3*

Group or Organization:
- Sherwood Park Golf Course Inc.
- Al-Terra Engineer
- Expert Lock Services Ltd.

2. Type of interest (please check as many as applicable):

Resident of study area	53
Resident of Strathcona County	26
Employed in Strathcona County	8
Employed in Edmonton	11
Travel through the area on a regular basis	24
Other	7*

***Other:**
- Business owner
- Would be affected by widening of RR 232 and entrance to East Whitecroft (south entrance)
- Retired
- Developer for Adjacent developments
- Country resident
- Business directly affected by transportation access
- I am expecting changes soon to RR 232. I got hit by a car while biking on October 7, 2002. I had a light on my bike, but when there is such a small shoulder nothing is safe! (Note: **The responses from this questionnaire are consistent with a questionnaire that was handed in from the same person for the first open house, over two months past the deadline. The responses from the first open house have not been included in the first open house summary, since we have had the second open house in the meantime.)**

Part 2: Project Proposals

The following questions are designed to gather your views about specific proposals for the Range Roads. You are also invited to provide any additional comments that may clarify your ratings and preferences for each proposal or alternative.

INTERSECTION IMPROVEMENTS:

a) It is proposed that existing and future intersections on the Range Roads be designed to include left turn lanes to improve safety and traffic flow. Please indicate your level of support for this type of improvement:

Do Not Support	Somewhat Support, But...	Support	Don't Know	Not Important To Me
4	3	50	-	-

Comments/suggestions:

- If traffic volumes warrant.
- The real problem is the amount and types of traffic on basically residential roads.
- Left turns are only a stopgap solution. What is need are either 4 lanes and/or traffic lights at entry points.
- This would make turning a lot safer and a void backup of traffic behind the turner, or edging onto the shoulder to get around.
- VERY NECESSARY.
- Having lived on RR 232 for 35 years, I have not seen a problem in this area and I have been retired for 20 years and am on the road continually (not sitting on the couch all day).
- BUT, until the province has decided what will happen to the south access off 522 into subdivisions (Sconaglen, Aspen Heights, South Chrenek Acres), these suggestions are irrelevant.
- This is a safety issue – must do!
- BUT until the issues of 628 changes are addressed, the suggestions here could be all for not.
- Just widen the base at each of the corners so right turns could sneak right.
- Lights at intersections for visibility of incoming traffics and wild animals e.g. deer, moose.
- Recognize displays are conceptual, but tapers look short.
- Slow speed down and this will go a long way to solving problem. Don't turn roads into highways – these are range roads.
- Right turn lanes are just as important as left-turn . Why aren't they also being considered?
- There should have never been an access into Walmart on RR 233. This has been the number 1 cause of traffic along this road.
- The intersection south of the Wye Road on RR 233 with entry and exit to Walmart is extremely unsafe in the present configuration.
- Excellent.
- It is very dependant on intersection. I agree that some of them would be of benefit, but others would be too costly for the benefit it would provide.
- Intersection improvements and lighting thereof are important. Lighting should not be high intensity so as to negatively affect immediate adjacent landowners but yet sufficient to be practical and meet appropriate safety requirements.
- Will this raise taxes for residents of affected subdivisions?
- We need left turning lanes for safety reasons.
- We are the first house in Whitecroft Heights. Several years ago RR 232 was widened, this required removing ~17 ft. of trees on the east boundary of our property. I would project to removing more trees as that would leave us sitting right beside the road, which is getting more traffic all the time.
- We need to have a pathway made for bikers, walkers, and kids on skateboards, rollerblades and scooters. Kids use RR 232 to commute to school for much of the year. **(Note: The responses from this questionnaire are consistent with a questionnaire that was handed in from the same person for the first open house, over two months past the deadline. The responses from the first open house have not been included in the first open house summary, since we have had the second open house in the meantime.)**

If you Support, or Somewhat Support the improvement of intersections, which alternative do you prefer?

ALTERNATIVE 1: **Raised Median Intersection**	18

Comments/suggestions:

- Too bad we have to be organized this way, but it is essential to slow down driving speeds.
- Painted does not work as well – see 232 as it gets to Wye Road. Most people drive over the painted lines. Impossible to see when there is fresh snow. Raised medians might also stop the "idiots" who pass on the solid line.

- Raised median allows for warning signs and can be seen more easily in the dark and where snow covered. They also split the traffic with more safety.
- Strictly for safety/designation of painted medians are not easily seen in winter and do not discourage drivers who choose to drive over/around or disregard.
- As some drivers have no respect for painted lines the raised median will at least control where to drive.
- Painted are confusing in the winter, or night when it is raining. Most people don't use them properly. Certainly not on 522!
- Painted medians are <u>not</u> visible under snow cover. Your study was conducted during 2 winters of record low precipitation.
- Prefer raised median provided that there is adequate lighting and adequate advanced widening of the lanes.

<u>ALTERNATIVE 2:</u> **Painted Median Intersection**	32

Comments/suggestions:

- When roads are snow-covered, raised medians reduce room.
- Raised median will only cause more problems especially with short distance of visibility heading north on 231 at Sconadale Road.
- Raised median too costly.
- Raised medians are potentially dangerous especially with snow.
- Cost.
- Arrows need to be painted and maintained on a more regular basis.
- The posted literature suggests this is a better alternative.
- Providing the painted lines are kept well visible at all times.
- Raised is good in cities. Out here painting is sufficient.
- More cost effective.
- As small as possible and consider noise buffers and also slow down speed. And add a few sets of lights. We don't need any more concrete islands in this County.
- Also provides easier entry onto the busier road in some situations for left-turning traffic from a subdivisional etc.
- Again this is dependent on the intersection. A combination would be more prudent.
- Painted would be fine for the most part, however, snow covered roads may cause some problems.
- Don't know.
- The Range Roads in the winter are slippery and not always clear. A raised median could cause accidents.
- I have lived in Sherwood Park (RR 232) for 26 years and the standard of living for families has dropped. Our taxes have gone up but our freedoms have dwindled. I should not have to drive my car into the city to go for a bike ride. **(<u>Note</u>: The responses from this questionnaire are consistent with a questionnaire that was handed in from the same person for the first open house, over two months past the deadline. The responses from the first open house have not been included in the first open house summary, since we have had the second open house in the meantime.)**

b) The operation and safety of the intersection of Range Road 233 and Ordze Avenue is of concern to Strathcona County and many residents. Three alternatives to alleviate problems at this intersection have been generated. After reviewing the displays discussing these, please indicate which alternative you prefer (check only ONE):

<u>ALTERNATIVE 1</u> • **Install traffic light at intersection** • **Widen the eastbound approach to RR 233 on Ordze Ave to two lanes**	27

Comments/suggestions:

- Traffic lights work better if they are timed better to allow traffic to flow. Example: north or southbound on Broadmoor/RR233, you can rarely hit green on Wye Road and Fir Street. You end up stopping at one or the other.
- This is a congested corner and N-S traffic is too often too quick for entry from service road.
- In addition to this access to Walmart off of Wye Road is necessary and should be made possible from both the east and west. This would reduce traffic on 233. A left-turn out of Walmart on the north exit would not be necessary.
- Should also include new access to Wye Rd as in other alternatives. Alternative 2 would not allow passage from Walmart parking lot to, for example, Canadian Tire.
- There were few problems until Walmart moved in. The permit granted for such developments as Walmart usually madate that the developer cover the costs of intersection upgrades. (This was the case for our small business). Walmart should cover this cost – <u>not</u> the taxpayers!!! Was this not addressed before the permit was granted?
- Alternative #1 – traffic lights, but also #2 or 3 2nd point (relocate access from Ordze Ave to Wye Road).

- Don't widen RR 233. Too much traffic will be noisy for residents.
- BUT, also modify Ordze Ave access to Wye Road as per Alternative 2.
- #2 completely denies access to businesses west of this intersection to people approaching from the south. #3 also limits inter-access between businesses.
- None of the above are very satisfactory solutions. What is wrong with making access to Walmart from Wye Road with left turn lanes provided? For example, see 23rd Ave in Edmonton will access to South Edmonton Common. This seems to work quite smoothly.
- I thought Walmart was to pay for this?
- Alt. #1 would still cause congestion with southbound traffic turning east into Walmart. If that could be solved, it's a better solution than the other two (both make it very inconvenient for northbound RR233 traffic to access the businesses on Ordze Road.
- Will this raise taxes for residents?
- Approve. See my drawings for my proposal. ***(See attached Drawing #1)***

ALTERNATIVE 2 • **Install concrete island to restrict the turns allowed at the intersection to right-in/right-out** • **Relocate the existing access from Ordze Ave to Wye Road to the east**	9

Comments/suggestions:

- #2 is the best of 3 not quite adequate solutions. The traffic crossing from Ordze Ave to Walmart and from Walmart to Ordze Ave causes a large part of the problem perhaps the main access to Walmart should be off Wye Road near the Shell station.
- Safer than others.
- Go back to root cause – don't apply a bandaid. I worry that traffic coming from Canadian Tire wanting to go to Walmart will have to turn south then do a "u" turn at Wye Road Gardens entrance to get to Walmart. The first measure should be to discourage traffic from using the range roads by encouraging a) acreage traffic traveling west on Wye Road to go south on Hwy 21 to Whitemud extension; and b) cars from north of Sherwood Park (Clarkdale Meadows, new areas) to use 21 to Whitemud extension or use Baseline Road and south on 14x? (The one connecting Hwy 16 and 14; Continue to lobby with Alberta Transportation). The second measure should be to encourage Walmart traffic to use the north entrance by making a more prominent entrance off of Wye Road. I would recommend a barrier on Walmart west entrance that would not allow southbound care to turn left into Walmart; rather get them to use the north entrance. (The Shell intersection should also be considered; this would encourage westbound Walmart traffic to use that entrance to get to Walmart).

ALTERNATIVE 3 • **Install a concrete island to prevent the eastbound through and left turn movements at the intersection** • **Relocate the existing access from Ordze Ave to Wye Road to the east**	9

Comments/suggestions:

- But… I don't support traffic westbound out of Walmart into Home Hardware area. The reason I support option 3 over option 2 is that living south of Home hardware, to get into the business in the area I would have to go to Wye Road then west to AW Rd., then take back access into Canadian Tire.
- But… No straight through traffic from Walmart - westbound. I agree with northbound traffic on 233 being able to turn left - westbound and not southbound traffic turning right - westbound.

DON'T SUPPORT any of the alternatives presented. Please elaborate below:	4

Comments/suggestions:

- Run road past east side of Canadian Tire to Wallace Road. Put traffic lights at the intersection of Wallace Road and 233. Close access to Ordze Ave and Walmart from 233.
- Not knowledgeable in this area.
- Close access to Walmart to traffic southbound on RR 233.
- I have no opinion as it does not affect me.
- I just don't know it well enough to have an opinion.
- Parts of each could make a better plan on any of these three. ***(See attached Drawing #2)***

c) Sightline and safety concerns have been raised about the intersection of Range Road 231 and Sconadale Road/Windsor Drive. A specific intersection design, unique to this location, has been developed to address the concerns. What is your view about the proposed design? Please mark the ONE response that best reflects your view:

Do Not Support	Somewhat Support, But...	Support	Don't Know	Not Important To Me
3	2	8	6	29

Comments/suggestions:

- There should also be a right turn lane on 231 heading north to accommodate turns onto Sconadale Road. We have almost been rear-ended there several times by vehicles following us too closely for the speed.
- Seldom travel there.
- Until the issue of the access on 522 is addressed with the province, this intersection design is irrelevant. As the province is talking about moving the south access, it will completely change traffic flow in the subdivision.
- Until the issues of 628 are addressed, the suggestions proposed are irrelevant!
- Goal of offsetting left turns is not accomplished.
- Some warning to motorists required coming from south for interim and budget to lower road in long term.
- There is also a sightline problem at the intersection of Wye Road and RR 233 for people coming from the south and wishing to make a left turn onto Wye Road. For some reason, the sightline for drivers traveling south is clear. A left turn arrow therefore need to be installed at these lights.
- Did not see design.
- Do not live on RR 231.

ACCESS CHANGES:

There are a number of existing driveway accesses onto the three range roads. In an effort to improve the safety and operation of these roads, some driveway accesses are proposed to be moved, closed, or combined. Please indicate your view on these changes by:

1) Indicating if you are personally affected (that is, if your access driveway is proposed to be changed)
2) Indicating your level of support for these changes:

a. My Access Driveway:

Is proposed to be changed	8

b. My Level of Support for Access Changes:

Do Not Support	Somewhat Support, But...	Support	Don't Know	Not Important To Me
3	2	2	-	-

Comments/suggestions:

- Close access to Hwy 628 from aspen Heights and widen access by mailboxes to access 233. DO NOT tie our subdivision into Fountain Creek Estates (PLEASE) *Probably more a concern for Stantec.
- The problem is the amount of traffic and speed. Lower these and the problem will be eased.
- Discussed with Chris Batty. I could be impacted by this change. It would be near impossible to change the existing driveway. A one-way driveway would be okay, if required. I feel specific studies are required for each and every driveway affected. Not a cast blanket approach to everyone.
- Proper turning lane for Whitemud to north on RR 233 and also for right turn on RR 231.

a. My Access Driveway:

Is *Not* proposed to change	45

b. My Level of Support for Access Changes:

Do Not Support	Somewhat Support, But...	Support	Don't Know	Not Important To Me
4	12	18	2	9

Comments/suggestions:

- Entire cost of the change should be covered – the individuals whose drive is changed should not have to pay anything.

- However, is the occasional use of these access points a problem? If each one is only used 2-4 times a day, is there a true traffic hazard?
- Each access must be looked at on an individual basis as to traffic flow, safety, etc. The people that the change most affects must have the final say.
- Each access into the subdivision needs to be looked at and addressed individually.
- I can understand homeowner concerns if present driveway access is significantly lengthened.
- Not the 2 long driveways. Perhaps just widen road so the person can turn right.
- Traffic impact is so minimal it doesn't seem worth the expense.
- In some cases where a long alternative P/W which destroys a lot of trees, relocation should be reviewed.
- Not directly affected, however, both alternatives would create a security issue (our property is Lot H). We could also find both of these alternatives create undesirable aesthetic problems (we would have a clear view of Walmart from property).
- This would clean up these RR's and make them safe. People should be able to walk or bike ride to Sherwood Park safely.
- These changes do not affect me, but I sympathize with the people who are affected. These problems would not have been so severe if Walmart had not been given permission to build where they did. Bad planning!
- Very sensible.
- Will this raise taxes? I have not encountered difficulties accessing RR 232 ,yself, or noticed problems on the affected driveway. I would respect affected people's wishes – appropriation of their land may affect their long-term plans for improvements/subdivision.
- Will mean more traffic trying to get on to 233 from Wallace Drive.

ACCESS CHANGES ON RR 233 (near Campbelltown)

In order to reduce the number of driveway accesses along Range Road 233, between Wallace Drive and South Avenue, two alternatives were generated for providing access to properties along the east side of the roadway. Please indicate which alternative you prefer:

Alternative 1	2

Comments/suggestions:

- The access was there before the volume of traffic was increased.
- Alternative 2 compounds the congestion at Wallace Road.

Alternative 2	14

Comments/suggestions:

- Perhaps the access road should be on lots 29, 30, 31, 32, and 33 to take some of the pressure off the lots fronting 233.
- Put the service road planned for the back of the acreages next to 233 on the back of the acreages east of them. That way, you will take away only ½ of the land from these people. (You will need land on the west of land from these for expanding 233).
- Pull cul northward into Lot F since only Lot G needs new access, not Lot H.
- But....see prior comments (Will this raise taxes? I have not encountered difficulties accessing RR 232 ,yself, or noticed problems on the affected driveway. I would respect affected people's wishes – appropriation of their land may affect their long-term plans for improvements/subdivision).

Neither	6

Comments/suggestions:

- Half of new roadway should be taken from each side of the properties then extended through South Ave.
- Both alternatives are very undesirable. Please see attached summary and suggestions. ***(See attached Comments #1)***

Don't Know	3

- Don't use this road very much!
- Alternative 2 appears most fair without knowing the house placement.

Not Important To Me	23

Comments/suggestions:

- No comment.
- Alternative 2 looks better, but it should depend on the resident's wishes.
- See comments to previous question (These changes do not affect me, but I sympathize with the people who are affected. These problems would not have been so severe if Walmart had not been given permission to build where they did. Bad planning!).
- See drawing. ***(See attached Drawing #1)***
- Don't live there; not affected; no comment.

OPERATING SPEEDS:

Speeding on the Range Roads has been identified as a significant issue of concern. In addition to the access changes and intersection improvements being proposed, a number of strategies concerning the posted speed limit are being considered to address this issue. Please indicate your preference below (check only ONE):

Do Nothing, leave Speed Limit at existing 80 km/hr	12

Comments/suggestions:

- With proposed changes, this should not be an issue any longer.
- With changes to intersection the traffic should flow. Speeding is enforced!
- We need more rumble strips and less maniacs on the road. How to do that?

Increase Enforcement of Existing 80km/hr Speed Limit	13

Comments/suggestions:

- Reducing the speed limit should not be required.
- Speed should be 60 past Whitecroft, and then go to 80.
- Speeding would not be an issue if the RCMP were doing their job!!
- Since the RCMP station was moved north, a police car is seldom seen on the south side of Sherwood Park unless it travel to an accident scene.
- Including recent change to 60 km/h at north end of RR 232.

Lower Speed Limit to 70 km/hr	16

Comments/suggestions:

- And ensure only local truck traffic is allowed.
- Speed limit should be lowered on 233 as it gets closer to Walmart.
- And enforce it.
- Lower to 70 and enforce the speed. This road is used so much now, not for residents who need to turn into neighborhoods, but as a short cut to the Whitemud and they are always in a hurray. Walmart area reduced to 50.
- 70 when twinned. 80 enforced until then.
- Greater enforcement is essential.
- Include increase in enforcement.
- Enforcement is a big problem. RR 233 has changed from a rural road to an urban one. Similar problems with enforcement throughout the county. I don't know what the solution is. Maybe more police? Speed bumps?
- Lowering the speed limit to 70 would only make a difference of 30 sec. From my residence to Wye Road.
- Enforce. There are many people and pets on these roads. Decreasing the speed would certainly help in their safety. However, this needs to be enforced. Many cars are going faster than 80 km/h.

Lower Speed Limit to 60 km/hr	15

Comments/suggestions:

- The whole length of 232 from Wye Road to 628 (Whitemud) needs to be one speed zone – not two. Two invites speeding in slow zone.
- Would definitely help – would likely reduce spends to 75 or 80km.
- Enforcement needs to be increased.

- Speed should be definitely 60 km/h to reduce noisy motorcyclists.
- And increase ENFORCEMENT. They are never, or very rarely, on these roads controlling the speed limit.
- Lowering speed limit to 60km/h at, or about, Sherwood Park Gold Course (northbound) would be the most desirable solution. Presently this road is never monitored for speeders. We have seen cars/motorcycles flying by at speeds in excess of 100km/h from our front window.
- Please see Item 18 in the attached summary. ***(See attached Comments #1)***
- With the volume of bikers and pedestrians the current speed is not safe.
- Enforcement so that they don't speed up to 80 km/h until after they pass the 80 km sign (going south). My children have a difficult and dangerous times crossing 233 from Wye Road Gardens because cars are going 80 km at our intersection.
- In October 2002, I got hit and run by a car while on my bike. I was on RR 232 and snce there is no shoulder or bike path, I got clipped by a car going over 80 km/h. We need lower speed limits. **(Note: The responses from this questionnaire are consistent with a questionnaire that was handed in from the same person for the first open house, over two months past the deadline. The responses from the first open house have not been included in the first open house summary, since we have had the second open house in the meantime.)**

Don't Know	1

ACCOMMODATING PEDESTRIANS

The absence of sidewalks along Range Roads 231, 232 and 233 was raised as an important concern by residents. To address this concern, a 3m wide asphalt sidewalk is proposed on one side of each of the range roads. In order to accommodate a sidewalk, approximately 5m of right of way will need to be acquired. Please indicate your level of support for inclusion of a sidewalk:

Do Not Support	Somewhat Support, But...	Support	Don't Know	Not Important To Me
10	3	43	-	-

Comments/suggestions:

- We would use the sidewalk regularly.
- Will this also allow bicycles? It should.
- A 2-meter sidewalk along with lower speeds.
- We would lose some of our property and lose our sound barrier of trees making it a very noisy place for us.
- The sidewalk should be on both sides of RR's and inside the subdivisions – not along them. If land has to be purchased anyway, spend a little more and get pleasant areas to walk.
- Sidewalk on 232 is long overdue – should have been part of original upgrading. Walking on 232 is dangerous and driving by pedestrians is unpleasant.
- VERY STRONGLY SUPPORT!
- This is critical to everyone's safety. I would rank this ahead of turning lanes.
- Very important for residents. We should be safe to walk or bike to connect to the Heritage Pathway. The road right now is totally unsafe to bike or walk.
- Very costly – I see limited utilization.
- Do not remove the trees along 233 to accommodate the sidewalk. Running a sidewalk through the trees would be my preference. (Example: Broadmoor Blvd., west of the golf course has the sidewalk in the trees). It makes for a beautiful drive or walk.
- Excellent idea!
- Offer reasonably wide shoulder for cyclists, walkers and runners.
- I have lived on RR 232 for 35 years and this is news to me. There is little foot traffic on this road except for the area from the Estates to Wye Road due to their close proximity to Sherwood Park.
- This was promised to us years ago. Please implement it before I am too old to use it.
- Strongly support for safety concerns and use of area for family recreation, etc. (biking, jogging, walking). Trail area in comparable communities attract families (St. Albert's trail system) and physical fitness.
- (232 + Yorkley Drive and 232 + Scot Cres. – 1+300)If you don't spend money on raised medians. If you don't move the 2 long driveways, just widen the road for access to the right just like intersections.
- Promotes and facilitates the County's focus on healthy lifestyles.

- What are going to do to run the trail through people's front yards? There have never been trails and this is the country, not the city. I think you have to decide what it is.
- MUCH NEEDED!
- We support this along with the reduction of speed limit as mentioned above.
- Presently mothers with children – other walkers – bicyclists are gravely at risk from high-speed drivers.
- This is VERY important. This would join communities.
- As long as it is on the east side of 232.
- Very few people walk into Sherwood Park from the acreage subdivisions, so a 5km right-of-way seems excessive. It would reduce our natural berm and destroy trees. The treed berm presently acts as an efficient sound barrier and we don't want to lose it.
- We live in a rural community of acreages adjacent to a major rural arterial road. I do not want pedestrians or bike riders adjacent to my property line. If you want urban amenities then live in an urban area. I strongly oppose any acquisition of my land unless you find a way to buffer me from pedestrian traffic that I am not presently exposed. If you want a bike path, then make it part of the road cross-section, not a separate path adjacent to my property or move your walk to the west side of RR 231.
- It would be wonderful to have sidewalks.
- This is critical, specifically on 233 where the residential communities are growing.
- Before and after school and work there are cyclists and joggers. During the shorter daylight hours they are impossible to see until too late when blinded by oncoming headlights.
- Very necessary.
- On west side of 233 so bike access for Fountain Creek.
- People in that area want a rural setting. Not with sidewalk as in urban area – nor streetlights – waste of money.
- Hopefully this time the 5m would be on the east side of RR 232 – the last time all the required property was taken from the west side of the road (232) about 15 years ago.
- There are too many overweight people, including me. We need bike/walking trails that are safe. Do whatever you have to do to make this happen.
- Getting hit by a car once on RR 232 is enough. Bikers, walkers, and kids need a safe way to access Sherwood Park. **(Note: The responses from this questionnaire are consistent with a questionnaire that was handed in from the same person for the first open house, over two months past the deadline. The responses from the first open house have not been included in the first open house summary, since we have had the second open house in the meantime.)**

If you have any other comments, suggestions or issues that you think should be addressed in this project, please bring them to our attention in the space below:

- I don't see the issue of noise being addressed. Rerouting traffic to use Hwy. 14 (216) and 21 would address some traffic volumes – I don't see this as an alternative being put forward. The results we see now are decisions the County has made in the past. Try to undo.
- I believe traffic volumes in the near future need to be carefully assessed. Current increases, if continued, may require more difficult major changes. If so, it's better to decide now than to wait 7 or 8 years and have to do it all over again.
- One solution might be to install traffic lights at one of the subdivision accesses for each subdivision. This would slow traffic and allow residents orderly access to RR's. Right now, living in Scot Haven, I have to wait a long time to gain access to 232 at many critical tines of the day. These changes are too cosmetic. I think a major solution is needed to hook up Wye Road to the Whitemud. As a result, sidewalks along 232, for example, would be a waste of money for the traffic is increasing all the time and can only get worse.
- Consideration should be given to extending the road immediately west of Wye Road Gardens from Ordze Rd to Fountain Creek Road and having the walking path follow adjacent to this road.
- Should be a left turn arrow from Wye Road onto 232. It's next to impossible to make that turn during rush hour – and very dangerous. Slope from north entrance of East Whitecroft onto 232 is too steep. In winter, it can get icy and you can only get out buy taking a run from too far back for vision of northbound traffic.
- 1) When driving from Sherwood Drive to RR 232, at Wye Road, two lanes become one. While relatively rare, you occasionally get people trying to go through on the right hand lane. Some method of closing that lanes before Wye Road would be nice; 2) Some subdivisions have relatively steep accesses to the RR (ex. South entrance of East Whitecroft). In winter this entrance is too slippery to start from a cold stop. You have to back up in order to have momentum, however, you then can not see the vehicles coming on 232 since the line of sight is bad there.
- (or another project) Education for residents to utilize Hwy 14 more to access the Whitemud Freeway. Cloverleaf at Hwy 14 and Baseline Road needs to be improved. Improve access from Hwy 14 to Wye Road (extremely unsafe now so people use RR instead).
- There needs to be a STOP sign coming out of Glenwood Cemetery onto RR 232.

- I would like a joint information session between this study and government plans for 628.
- 1) Install lights at 231, 232 and 233 from Highway 628; 2) Reduce all speed limits to 70km from 80 km; 3) Discourage all but local traffic to use 628 by having traffic use 14X to Fort Saskatchewan, Lloydminster and south to Camrose; 4) Reduced traffic and reduced speed limits will reduce many of the concerns about safety; 5) Lights will encourage all but local traffic to take alternative, free-slowing routes.
- Very concerned about access to 628 from 232 and 233 in winter when roads are icy in a.m. rush hour. Also, ability of vehicles to cross 628 at 232 during a.m./p.m. rush hours.
- Traffic lights should be a major concern for safety reasons.
- Noise levels have not been addressed. Subdivisions bordering Twp. Rd 522 have experienced a huge increase in acceptable noise levels over the past 5 years.
- Priority #1 – Bike path/sidewalk. This is a safety issue. I believe someone will be run over is not implemented. Priority #2 – Intersection of 233 and Ordze Ave. This intersection is a free-for-all.
- I live in Sconaglen Estates. The Department of Highways is not finished with their proposal to close our entrances on 522 and provide us with new roads to access our subdivision. Some of their proposal, impact volume on Sconadale Road, has been addressed.
- RR 232 – Re: 1+300 Proposed Preferred access location – too long a driveway. Too much swamp – lowest spot on the road. Not much traffic to the house. Not worth the expense of making the driveway. 1+500 a stop sign could be a yield sign (when merging central subdivision road with Scot Cresent).
- Lights need to be placed on each of the main roads. It is simply too dark at nights and drivers often drive with bright lights on.
- It would make sendse to focus on critical areas first and evaluate the improvements.
- For RR 233 consider carrying four lanes further south so traffic has channelized itself before reaching busy intersection.
- For future development this County really needs to look at what will happen in the future and leave road allowances wide enough to accommodate future growth. And do this before the fact, not after.
- Residents of Wye Road Gardens are very limited to access and exit. It would be quite beneficial to have Wallace Drive, west of RR 233, extended west to Ordze Road.
- Because proposed changes do not directly affect us in terms of physical changes to our property, we remain concerned for the safety, security, aesthetic and resale value of our property should the changes be implemented. We feel that incorporating medians and reducing speed limits along RR 233 would eliminate many of the safety issues of residents whose driveway access is directly on this road. Also, by eliminating direct access into Walmart parking lot off RR 233 and relocating the main access to Wye Road, much of the present traffic would be redirected to Hwy. 14 (was that not the purpose of creating the overpass at Hwy. 14 and the Whitemud?).
- Please see attached summary. ***(See attached Comments #1)***
- The changes proposed are very good. Hopefully, "the few" don't cripple the majority.
- Is it necessary to have a left-hand turn lane into Winfield Heights at the southern most entrance? The drivers heading north at this location are just turning from 628 and speed is not a concern as the vehicles here are well below the speed limit as the traffic have just turned or come from a stop. In addition, the volume of people tuning left at that intersection does/may not warrant a proposed change.
- A footpath would be adequate for pedestrian use, but would reduce the privacy of our acreage if it cut through our berm. We would probably request a chain link fence be built between our land and the footpath if one were to be constructed. Traffic lights should be installed all all 3 intersection of the range roads with Twp Rd 522. These might encourage Sherwood Park drivers to use Hwy 14 instead of RR. Millions of dollars were spent on overpasses etc. to make access to the Whitemud safer but drivers don't seem to like these and prefer to go where their access isn't controlled.
- Turning lanes and merge lanes need to be addressed for the delivery of vehicles (semi-trailers) and construction vehicles (tractor-trailers with bobcats, dump trucks, etc.) at Salisbury greenhouse; and the funeral processionals at Glenwood Cemetery immediately opposite. The intersection at Wye Road and RR 232 needs reassessing. Turners from RR 232 northbound onto Wye Road westbound – and from Wye Road westbound onto RR 232 southbound – are not aligned to see oncoming traffic. On the NE corner of Hwy 628 and RR 232 there appears to be a new access driveway being constructed!
- I indicated on the previous survey and wish to repeat that the raised median at Wallace Ave. concerns me because there is inadequate widening of 233 prior to the median as one is driving north. This might be resolved by either a) moving the south end of the median further north; b) providing additional lighting at the median. RR 233 can be quite slippery at that intersection and I fear that despite the warning light, someone northbound will hit the median.
- Would this also serve as a bike path? I hope so. I would enjoy riding my bike into Sherwood Park, but traffic is so busy now it is not safe. Also my son who bikes into Sherwood Park from Carriage Lane has had 2 really close calls, actually been hit by a car and thrown into the ditch just about 2 weeks ago.

- Students from schools all over south Sherwood Aprk commute in from the acreages when the weather is decent. Because of no pedestrian path, kids skateboard into town using the lane of on-coming traffic when cars are not near to them: this is dangerous! BIKE HELMETS WON'T DO THE JOB! We nee a safe path for people choosing an environmentally friendly method of traveling. **(Note: The responses from this questionnaire are consistent with a questionnaire that was handed in from the same person for the first open house, over two months past the deadline. The responses from the first open house have not been included in the first open house summary, since we have had the second open house in the meantime.)**

Part 3: About This Open House

1. The quality of the information displays was:

Poor – 1	2	3	4	Excellent - 5
1	4	12	22	13

Comments/suggestions:

- Only certain proposals being put forward.
- I would suggest a short (5 – 10 minutes) talk at, say, 5 and 6, to ensure everyone gets the same information. Advertise that there will be a short "formal" discussion at those times, with displays and representation before and after.
- Confusing and poor lighting.
- Acceptable.
- I live in South Chrenek Acres, which borders Twp Rd 522. The issue of closing the access on 522, which is proposed by the province, has not been addressed.
- Issues were not addressed on the changes of 522 – which may have a direct impact on the suggestions and changes proposed for RR 231, 232 and 233.
- Visual information was clear and easy to understand. Personnel were informative, friendly and easy to understand.
- Even I understood them (most of them).
- Quality of pictures could have been better.
- Poor lighting.
- There were issues identifying specific property lines and road allowances. In addition, many of the suggestions were too generic to be applied to some of the areas of concern.
- The 'island' coming north on 223 before Wye Road, like any 'island' is about 6 inches g=high with vertical edges. In the dark, you can't see it and might lose a wheel. How about making the 'islands' with a little slope or lower to save a few bent axles?
- I asked some questions about future R.O.W. and got a poor, vague, unknowledgeable answer??
- I was disappointed with the inadequacy of information proved at the previous open house. This open house was much more useful.
- Couldn't attend open house.
- Was not there at open house.

2. Notification about the Open House was:

Poor – 1	2	3	4	Excellent - 5
1	-	8	18	22

How did you hear about this event

Newspaper	4
Mail Out	24
Other	

Comments/suggestions:

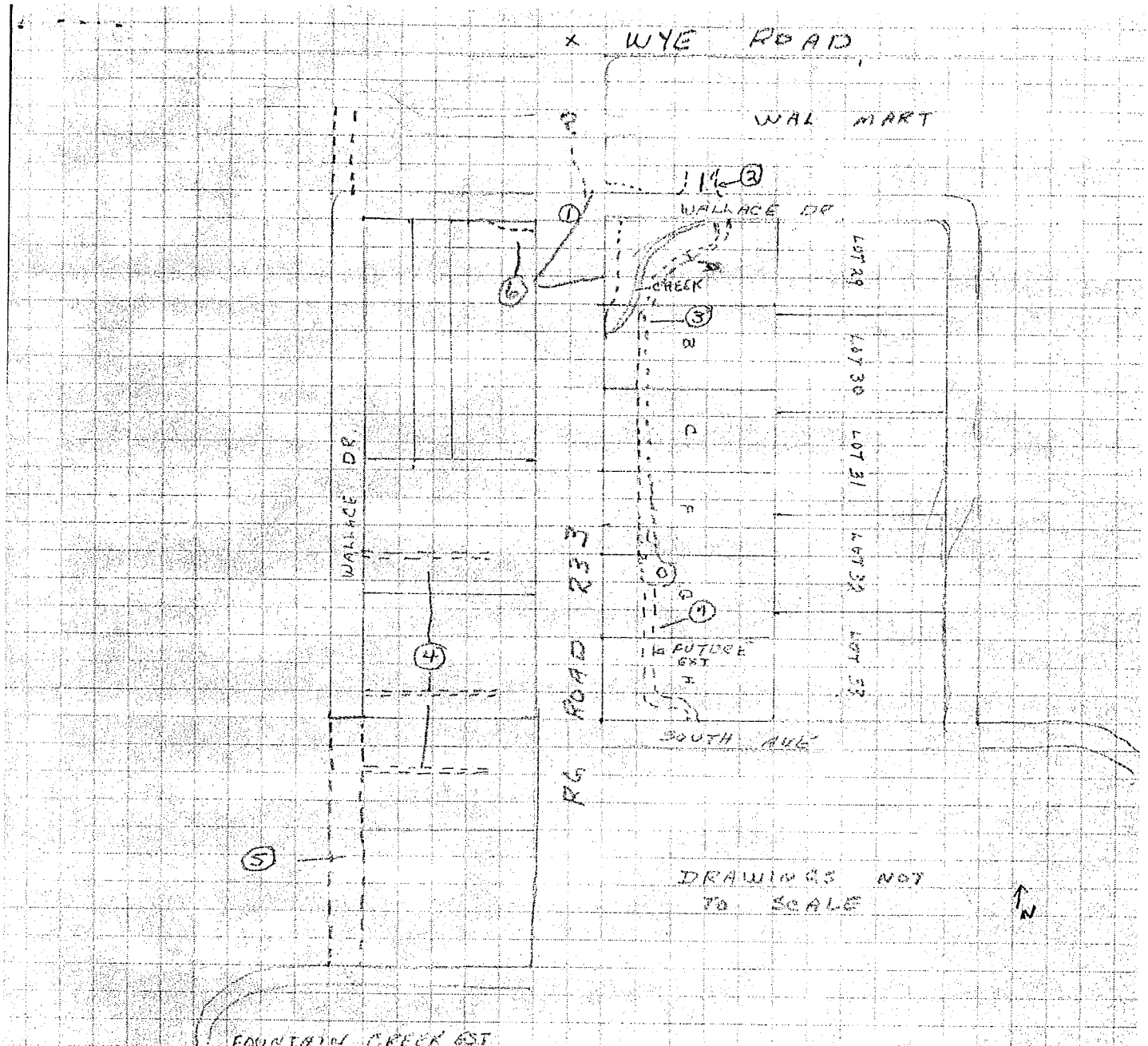
- Mail out was a great idea and appreciated (otherwise I wouldn't have heard about the open house). However, receiving it on Monday for a Wednesday meeting required significant re-juggling of our schedules.
- A map to find the open house would be nice as there are lots of new people.
- Couldn't attend open house.
- Was not there at open house.

3. The Open House Venue was:

Poor – 1	2	3	4	Excellent - 5
-	1	6	21	26

Comments/suggestions:

- The refreshments were yummy. Thank you.
- Since we expect County-related meetings to be at the County offices, your ads/notices should highlight that it is not there and there could be signs on the County office doors letting people know.
- Other than lights. Staff not knowledgeable enough about our district at least RR 233 (Fountain Creek). Thanks for encouraging feedback!
- Good coffee too!
- Lots of personnel. Good snacks and juices. Good use of this location.
- Good presentation and space and location.
- Couldn't attend open house.
- Was not there at open house.



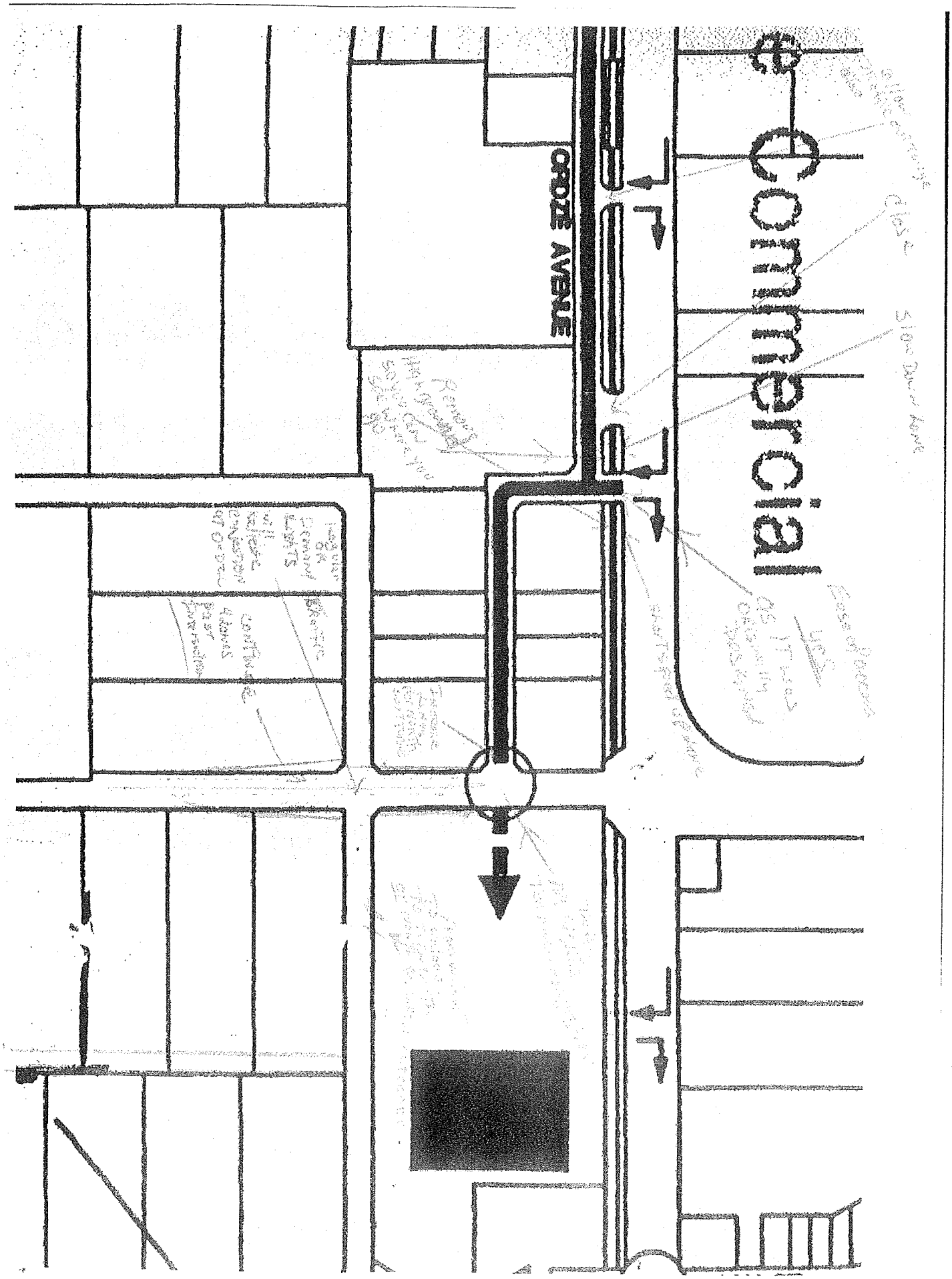
(1) LIGHTS SYNCRONIZED WITH WYE RD
(3) NEW ENTRANCE + EXIT WALMART TO WALLACE DR
(5) SERVICE RD TO EXIT ON WALLACE DR
(4) MOVE THESE APPROACHES TO WALLACE DR
(5) EXTEND WALLACE DR TO FOUNTAIN CR. EST.
(6) TURNING LANES
(7) THIS WOULD GIVE 2 POSSIBLE INT - EXIT

NOTES

(2) THIS ENT - EXIT WOULD ALLOW TRAFFIC GOING SOUTH TO TURN IN SAFETY AT THE LIGHTS. THIS WOULD ALSO ELEVIATE SOME OF THE PROBLEMS AT ORDER AVE + 23RD.

(5) PLACING THE SERVICE RD AS SHOWN WOULD POSE NO PROBLEMS TO LOTS 29-32.

Drawing #2



EXPERT LOCK SERVICES LTD.

183 Ordze Ave
Sherwood Park, Alberta T8B 1M6

Phone 780 464 2610
Fax 780 464 2620

November 29 2002

Re: Three proposals for the RR233 - Ordze Avenue - Wye Road

We feel that parts of the three proposals together could make the best solution for the traffic congestion on Wye Road - RR233 south past Ordze Avenue and further south on RR233 past Wallace Drive.

Alternative #1: Yes. Widen eastbound approach to RR233 on Ordze Avenue to two lanes, but keep the southwest corner clear of trees and buildings so you can see oncoming traffic.

Alternative #2 and #3: Yes. Relocate the existing access from Ordze Avenue to Wye Road to align it with the south turn by the Dairy Queen to give simple access in and out. However, in addition to this, a slow down lane should also be included for eastbound Wye Road traffic to turn south at this intersection for safety in heavy traffic times. In addition, a short speed-up lane would help merge traffic coming out of this intersection back onto Wye Road.

The ground height covering the gas pipeline along the south of Wye Road between the existing access from Wye Road to Ordze Avenue at the Dairy Queen is higher, blocking the view of motorists in seeing the ease of access. The motorist must see that it is easy to get in and out before they will choose this route, so the height must be reduced.

Further, RR233 south of the Ordze Avenue intersection should be widened for both directions of traffic, continuing past Wallace Drive for at least 200 yards. This would allow those going south to merge safely and those going north to divide into the direction they are going so oncoming traffic turning and traffic crossing at Ordze Avenue can clearly see drivers' intentions and cross safely without waiting for all traffic to pass before acting.

An egress from the Walmart parking lot to the road on the south would allow traffic that wants to turn south to have an unobstructed intersection to do this. Perhaps a demand traffic light could be placed here to allow vehicles turning south onto RR233 from Wallace Drive along with traffic turning north onto RR233 from the other side to cross safely.

I have enclosed a diagram that may help express my opinion.

Thanks.

Daniel Kuefler
Expert Lock Services Ltd

DEC 09 2002
Edmonton, AB

To: Strathcona council (board members)

I am writing you a letter with a broken hand so if my writing is not artistic, it is because of the cast on my hand. I got hit by a car on Range Rd 232 township 52 (Whitemud) while biking. The car was going ± 80 km/h and did not see me even though I had a red bike light on the back of my seat. Had I been 1 foot over I would have been killed. The mirror of the car hit my leg & handle bar as it drove by. The driver did not even know he hit me & kept going down the road.

With shoulders only about 1 ft wide, it is dangerous for kids & adults on Range Roads 231, 232, and 233 to bike, walk, jog, rollerblade, or skateboard. The roads weren't this dangerous in 1976 when we moved to Winfield Hgts. Since 1976, all that county office cares about is turning these roads into quick Whitemud access routes for Sherwood Park residents while acreage owners can't even safely go for a walk. On numerous mornings while driving to schools in Sherwood Park & Edmonton to supply teach, I see junior high & Sr high students roller-blading, biking, & skateboarding on RR 232 between Scott Haven & Wye Road. Because there is no shoulder on the road, these students would be seen in groups going down the middle of the car lanes of opposing traffic. Is this safe for students? Should not the children & adult on acreages be able to safely bike or rollerblade to school, friends, & work like those in Sherwood Park who enjoy a well designed, thorough, & safe bike path system. My parents are still

in Winfield and my wife & I built in Carriage Lane. Both of us pay taxes higher than those in the Park but for what? We have higher utility service charges and had to install our own sewer & cisterns. It is only fair that we have bike trails built along these roads: especially if all these "4-lane" RangeRd plans come into being.

I already talked to your road engineers & they told me to inform you of the current situation. If you do not make it safer for those students who bike or board to SCA, Sherwood Hgts, Pine Street, Sal Camp, OLPH, & Cambletown schools, a fatality is sure to happen sooner or later. Many students on acreages bike to school come May & June each year!

If pollution reduction, environmental restoration and public health are concerns for Canadians' way of life as the media keeps preaching at us, then (trails) linking up all of Sherwood Park with itself & with Edmonton should be a top priority!

Please hear me straight. We do not want water, sewer, or street lights installed on our acreages. All we want is a well developed system of bike paths running alongside the main roadways.

Thanks

Bart, Leanne Rohrick

Dave and Marj Rohrick

1/2

Functional Planning Study-Access Changes on RR 233

The Project Proposal to close our existing access driveway to Range Road 233 between Wallace Drive and South Avenue and to provide an alternative along the east side of our acreage at the rear of our Country Residential property is highly undesirable for the following reasons:

1) Our present driveway with gas lighting would be displaced and extensive landscaping revision with removal of the present hard surface and replacement of shrubs, trees, lawns and flower-beds would be an expensive undertaking.

2) Our reception area and the general appeal of the property would be lost as well as complete disorientation for visitors, deliveries and many other services including fire and security would be hampered. Insurance costs would increase dramatically.

3) Our septic system would be disrupted by the construction of an alternative roadway through the length of the acreage to our home and garage area. Replacement of the system including leaching tank would pose considerable expense.

4) Our valley pond and bird sanctuary would be lost together with underground facilities for watering lawns and garden.

5) Native shrubs and trees in the valley together with a small creek would be destroyed.

6) The general topography of the acreage would not lend itself to the construction of an alternative access roadway from east to west without destroying the natural features, lawns and pasture which we have developed over the years. Tons of fill would be required to level the grade for a road.

7) Our greenhouse, doghouse and wire run together with garden area and lawns in the valley would be lost.

8) Cross fencing with access gates would require replacing.

9) Underground power cable to greenhouse and stable would be destroyed.

10) Our stable with two box-stalls, two tie-stalls with attached hay barn would be lost to the proposed east roadway.

11) Our equestrian riding ring area would be lost to the proposed turn-around at the end of the east roadway.

12) The proposed east roadway with turn-around together with a road to the west end of the acreage would require at least an acre out of ~~out of~~ our pastureland.

13) The proposed roadway to access our house and garage would be some five to six hundred yards long which would require considerable maintenance and snow removable challenge.

14) Our deepwater well could be affected by the extensive topographical changes brought about by relocating our present access to 233.

15) From the foregoing observations it will be apparent that with the extensive disruption of services brought about by a change to our access to 233 we would be required to vacate the premises until a complete remake of the acreage takes place.

16) The many improvements that we have made over the past thirty-two years would be completely lost by the closing of our present access to 233 and taxes that we have paid towards the maintenance of our Range Road 233 in order to access our acreage, as other Country Residents have done, would certainly be unjustly accepted by longterm residents.

17) The Range Roads referred to in the Functional Planning Study exist to provide access to Country Residential acreages and to restrict access to some longest users and cause unnessary disruption with needless expense with drastic loss of value to their property is wrong.

18) Recent development south of the Wye on 233 has slightly increased traffic but the greatest increase has been caused by the increase of the speed to 80 km/hr resulting in non-resident drivers, buses, and longhaulers to use this route to by-pass from the Wye and connect with Whitemud Freeway as they proceed West and South and Vise-versa. This route obviates the necessity for them to turn off the Wye onto Hwy 14 and then onto the Whitemud Fwy and vise-versa with a saving of time and having the advantage of the 80 km/hr - I see this every day. Restoring the speed limit to 60 km/hr and restricting commercial buses and heavy haulers . by signing will definitely reduce traffic.

Range Roads 231, 232 and 233, from Highway 628 to Wye Road

FUNCTIONAL PLANNING STUDY

Project Information Sheet (April 2003)

Project Background

Strathcona County is experiencing significant development and growth which could impact Range Roads 231, 232 and 233. Earth Tech (Canada) Inc. has been retained by Strathcona County to conduct a Functional Planning Study of RR 231, 232 and 233, from Highway 628 to Wye Road, to determine future requirements for these roadways.

Project Objectives

The objectives of this project are to:

- Identify upgrading needs to rectify any existing problems, to accommodate future growth, and to manage access;
- Ensure compatibility with provincial plans for Hwy 628 (Twp Rd 522);
- Identify a recommended cross-section, urban or rural, for the roadways should there be a need to change their configuration in the future;
- Identify stormwater management requirements for each of the roadway corridors;
- Identify how pedestrians and other trail users will be accommodated along the upgraded roadways;
- Identify any noise attenuation requirements for each of the roadways;
- Identify right-of-way requirements to accommodate the recommended roadway improvements with all related elements such as drainage, utilities, pedestrian facilities and noise attenuation facilities; and,
- Identify an implementations strategy based on the priority of the recommended improvements.

Recommended Plan

Overview

At the second open house held in November 2002, several alternatives to improve the three range roads were presented. Fifty-seven (57) questionnaires were returned with feedback on the alternatives developed by the project team. Based on the feedback received and technical considerations, the project team in consultation with Strathcona County has created a "Recommended Plan." A tentative implementation schedule is included on the back of this sheet.

Roadway Twinning

North of Wye Road, each of the range roads is a four-lane divided roadway. At present, the transitions from a four-lane road to a two-lane road occur very abruptly immediately south of Wye Road. This can lead to driver confusion and erratic manoeuvers. In order to create safer, smoother transitions, each of the range roads is being twinned for some distance south of Wye Road. Typically, the twinning is taken to the next intersection south of Wye Road.

Intersection Improvements - General

In order to improve traffic flow and safety along the three range roads, it is recommended that turn lanes with a raised median be implemented at all existing and future subdivision entrances and other major access points.

Intersection Improvements near Wal-Mart

In order to address traffic problems on Range Road 233 at Ordze Avenue, the following changes are recommended:

- Localized widening of Ordze Avenue immediately west of RR 233 to create two eastbound lanes approaching RR 233.
- Installation of a traffic signal at RR 233 and Ordze Ave to facilitate movement onto and across RR 233.
- Creation of a left turn lane from Wye Road into the Wal-Mart site

Access Changes

To improve traffic flow and safety on the three range roads, a number of access modifications are being recommended. These modifications are intended to reduce the number of accesses from individual properties and/or to re-arrange accesses to better locations.

Posted Speeds

Based on feedback from residents and road users and through speed surveys conducted by Strathcona County, the existing 80 km/hr speed limit on the three range roads will be reduced to 70 km/hr.

Right of Way Requirements

To address existing traffic concerns, and to accommodate possible future growth, it is recommended that a minimum right of way of 40m be reserved for each of the range roads and an additional 5m right of way be reserved for a multi-use trail, for a total right of way of 45m. This is in keeping with Strathcona County's current standards.

Pedestrian Circulation

A 3.0m wide trail is to be developed along one side of each of the range roads. In order to accommodate such a trail, it will be necessary to acquire land from adjacent property owners.

Your Role in the Project

Please continue to share your thoughts with us on how the project affects you and your community, and on how to make the project a success, by:

☑ **Completing a Questionnaire**
Available at the project open houses, or upon your request.

☑ **Contacting the Project Manager:**

Hassan Shaheen, P.Eng.
Earth Tech (Canada) Inc.
17203 – 103 Avenue
Edmonton, Alberta T5S 1J4
Phone: (780) 488-6800
Fax: (780) 488-2121

Tentative Implementation Schedule

Tasks	Range Road 233			Range Road 232			Range Road 231		
	1-5 yrs.	6-10 yrs.	10-15 yrs.	1-5 yrs.	6-10 yrs.	10-15 yrs.	1-5 yrs.	6-10 yrs.	10-15 yrs.
Budget Approval									
Land Acquisition	X				X				X
Construction:									
Wye Rd./Wal-Mart Access	X								
RR 233 at Ordze Avenue	X								
Trail	X				X				X
Twinning		X				X			X
Intersection Improvements	X				X				X
Access Relocation	X					X			X
Posted Speed Review	X				X				X
RR 232/Wye Road:									
Intersection Review				X					
Intersection Construction					X				

NOTE: Schedule is tentative and subject to budget approvals, land acquisition process, adjacent and developments, traffic volumes, etc.

Strathcona County

EARTH TECH
A tyco INTERNATIONAL LTD COMPANY

RANGE ROADS 231, 232 AND 233
Functional Planning Study
Open House Questionnaire – April 23, 2003

The project team for the Range Roads 231, 232 and 233, from Highway 628 to Wye Road Functional Planning Study held its third and final Open House on April 23, 2003, in the Strathcona County building. Local residents were alerted to the event through a mail out to property owners, and an advertisement in one local newspaper (Friday, April 11 and Thursday, April 17) in the Strathcona County This Week. Seventy-four people signed in at the event, but true attendance was approximately 88.

A number of drawings of the "recommended plan" were created and displayed for the public to comment on. The Project Information Sheet handed out provided a general overview of the "recommended plan" that was being shown. A summary of the feedback received at the second Open House and several information panels were shown to supply project information, modeled after the details from the previous Open House. The displays supplemented the information provided by the five project technical representatives, who circulated throughout the room. All attendees were given a detailed questionnaire and were encouraged to fill it out and return it before leaving the event. Some of these were completed and returned after the open house; the deadline to do so was April 30, 2003. In total, 42 questionnaires were returned. The input gathered through these documents is summarized in the following sections, in the order the questions appeared on the sheet:

Part 1: About You

1. Are you responding to this questionnaire as (please check only one):

An Individual	Representative of Group or Organization
42	3*

Group or Organization:

- Victory Baptist Church
- Son in Carriage Lane
- Country Road Greenhouses
- AD & MD Watson – 52355 RR 233, Sherwood Park, T5B 1C6 – 467-2826

2. Type of interest (please check as many as applicable):

Resident of study area	37
Resident of Strathcona County	22
Employed in Strathcona County	3
Employed in Edmonton	7
Travel through the area on a regular basis	19
Other	3*

***Other:**

- Situated on RR 231.
- Landowner in study area.
- Plan to build.
- RR 233, Lot G, 33 years.

Part 2: The "Recommended Plan"

Please share your thoughts on the "Recommended Plan" by checking the rating that best describes your views. You are also invited to provide any additional comments that may clarify your selected rating for each element of the Plan.

INTERSECTION IMPROVEMENTS:

a) Along Range Road 231:

Do Not Support	Support	Don't Know
1	21	6

Comments/suggestions:

- We don't use this road very often.
- Reduce speed immediately to 70km/h.
- RR 231 and Twp Rd 522 has had several collisions. RR 231 and Sconadale Road has poor visibility because of the hill.
- The south entrance to Windsor Estates will be negatively impacted. Turning north on RR 231 will now require traffic to cross and additional turning lane. The hill reduces visibility already and causes and unsafe access. Reducing posted speed will do little to help. Merge lane required.
- Support.....but NOT 45m right-of-way. It will be 10 feet inside the greenhouse. See attached letter. ***(See Letter #1)***
- The problem is not the turning off of 232, the larger problem is getting onto 232 if a left turn is required. The additional lanes should be "accelerating" lanes, not slow down lanes (ideally both). ***(See Diagram #1)***
- Strongly feel that speed limit should be reduced NOW, not in 10-15 years and that speed limit should be enforced regularly.
- Support everything except speed change. Should remain at 80 km/h.
- RR 233 has more delays than RR 232 or 231.
- I am concerned that there is no mention in your project objectives that make any reference to working with the long-term residents and citizens of Strathcona County in a collaborative way – all objectives are focused on the County's needs. Accessing land without taking into consideration the long tern residents and the fact that the integrity of County residents lifestyle has changed with increased traffic. No access off 233 is inappropriate. Service roads s needed. More attention paid to the need of long-term residents and change in environment.

b) Along Range Road 232:

Do Not Support	Support	Don't Know
2	21	5

Comments/suggestions:

- We don't use this road very often.
- Also depends on plan for 522 (628).
- But the culvert draining East Whitecroft to West Whitecroft must be lowered so run-off from East Whitecroft and Graham Heights does not flood lot 10A.
- Access out of Estate Drive is getting dangerous, with no enforcement access to 232 is getting to the point that I personally have had 2 cases of road rage brought onto me because I was going the posted speed. I have lived in the Estates for 13 years and since the Whitemud extension was completed traffic in peak hours has very notably increased. I talked to your consultants about twinning it all the way to Salisbury Greenhouses. With Salisbury running 12 months of the year, traffic on weekends is panicky. I have shared my views with the consultants at the open house have hope my views and ideas hold merit with them and the County. Traffic increased 1) due to full-time funeral home and still no access lanes; 2) due to Salisbury running a 12 month operation and increasingly being busier due to population influx. Still no access to and from; 3) Whitemud overpass, increased road usage still no acceleration/deceleration lanes in and out of Estates Drive, Salisbury Greenhouse and the Funeral and Cemetery business. All in all, more accidents and road rage due to County officials not realizing or foreseeing traffic increases. Also dropping speed on 232 south of Salisbury is not an issue at all as there is no subdivisions expected south of Salisbury and the right half or left turning is never an issue even driving peak hours south of Salisbury Greenhouse.
- I disagree that raised medians should be placed at intersection. The 3m required for the trail is unnecessary. The trail would be under-utilized. Sherwood Park has numerous parks, a great trail system that the public has access too.

- Fail to see the need for a trail. Would like intersections to remain intact (alignment).
- Support everything except speed change. Should remain at 80 km/h.

c) Along Range Road 233:

Do Not Support	Support	Don't Know
3	28	3

Comments/suggestions:

- Approve of lowering speeds – large trucks using roads, not addresses; noise not addressed; diverting traffic to Hwy 216 not addressed.
- Semi-support.
- Support the lights. Road needs widening. Road needs a sidewalk on west side of road.
- Perhaps add a deceleration lane at Fountain Creek Road, southbound on 233.
- You MUST put a walking path on the east side of RR 233. Surely those of us that have paid taxes for over 35 years for FEW services deserve this consideration, particularly when paths travel for miles thought the northern parts of Sherwood Park.
- What future plans are in place for sound abatement?
- Like the bike path. Need a sidewalk by Home Hardware on 233.
- Support everything except speed change. Should remain at 80 km/h.
- Configuration shown is not acceptable – present tree and shrub berm would be lost including some 30 mixture trees plus shrubs and hedging. Location would jeopardize my 200' well and servicing of our septic system. Driveway re-alignment would require loss of 150' rock wall. Loss of trees and shrubs would mean noise will be a serious problem.
- IMPORTANT!! Don't support no access to properties – suggest a service road to maintain access from front of property. New proposed road at back of property is UNACCEPTABLE.

d) At Range Road 233 and Ordze Avenue:

Do Not Support	Support	Don't Know
3	30	

Comments/suggestions:

- This is very busy and I have seen many near-miss accidents. The lights are welcomed and will hopefully solve the congestion problem.
- Access off Wye Road to Walmart should be improved – east and west.
- Support the lights.
- First choice, which I have been told will never happen, is to deny left turn entrance to Wal-Mart west entrance to southbound traffic. The west entrance to Wal-Mart should never have been the prominent entrance. The north entrance is like a back door – make like a front door, wider, more welcoming. Eastbound traffic never uses the north entrance – they turn south at 233 and use the west entrance (is back up along Wye Road at Christmas). Second choice is to accept traffic lights so my children can cross 233 safely, at controlled intersections (traffic and walk lights).

e) Wye Road (east of RR 233) at Wal-Mart access:

Do Not Support	Support	Don't Know
5	28	3

Comments/suggestions:

- See "d" (Access off Wye Road to Walmart should be improved – east and west).
- Will create 2 nightmares.
- Dumb idea! Just park an ambulance there to pick up bodies. Wal-Mart should have a service road like Canadian Tire and Home Hardware. They could still do it!
- Good. Like the trail and expansion on the west side.
- Install lights.
- If this is north access, fully support the left turn. See other comments (The west entrance to Wal-Mart should never have been the prominent entrance. The north entrance is like a back door – make like a front door, wider, more welcoming.

Eastbound traffic never uses the north entrance – they turn south at 233 and use the west entrance (is back up along Wye Road at Christmas).

- I think that by putting traffic lights at this intersection, traffic at Wye Road is going to become even more congested. As is, the lights at Wye Road and Fir Street are not coordinated. Very often you cannot go north across Wye Road because traffic is backed up at Fir Street. Bu adding another set of lights at Wal-Mart, this situation is going to be compounded. I thin other alternatives need to be explored.

ACCESS CHANGES:

a. My Access Driveway:

Is recommended to be changed	9

b) My Level of Support for Access Changes along Range Road 231:

Do Not Support	**Support**	**Don't Know**
1	2	3

Comments/suggestions:

- Not affected.
- Would like 231 widened south half of 521 to Highway 628. See attached letter. ***(See Letter #1)***

c) My Level of Support for Access Changes along Range Road 232:

Do Not Support	**Support**	**Don't Know**
2	1	2

Comments/suggestions:

- Could be accomplished in a different fashion.

d) My Level of Support for Access Changes along Range Road 233 (near Campbelltown):

Do Not Support	**Support**	**Don't Know**
4	3	2

Comments/suggestions:

- Making an access from the back of my property as you have shown at the last meeting would be devastating for us, which we would like to discuss with you.
- To interfere with long-established residential acreage property access effects basic planning done years ago to obtain a well-managed parcel of land and at considerable expense and should be given every consideration.

a. My Access Driveway:

Is *Not* recommended to change	25

b) My Level of Support for Access Changes along Range Road 231:

Do Not Support	**Support**	**Don't Know**
3	8	7

Comments/suggestions:

- Don't know, but if the access will make the road safer, than I support it.

c) My Level of Support for Access Changes along Range Road 232:

Do Not Support	**Support**	**Don't Know**

Do Not Support	Support	Don't Know
2	11	7

Comments/suggestions:

- Same as above (Don't know, but if the access will make the road safer, than I support it.).
- Removal of trees for road widening will result in increase of road noise. Are you installing noise barriers where necessary?

d) My Level of Support for Access Changes along Range Road 233 (near Campbelltown):

Do Not Support	Support	Don't Know
2	19	2

Comments/suggestions:

- Road extension, sidewalk much needed.

SPEED LIMIT CHANGES:

a) Lower speed limit to 70km/h on Range Roads 231, 232 and 233:

Do Not Support	Support	Don't Know
16	25	

Comments/suggestions:

- The speed limit is too high now. And RR 233 is very dangerous. It would not bother us if it went to 60km/h.
- Leave at 80km/h.
- Strongly support; issue of large trucks using RR 233 as a thruway must be addressed.
- I don't think it's necessary at this time.
- RR 231 could remain at 80km/h.
- Urgently needed.
- Leave it at 80km/h and move the traffic.
- Results posted showed that 44% of those who responded wanted the speed limit to remain at 80km/r (with and without added enforcement). I don't see how the 26% of those wanting to lower the speed to 70 km/h take precedence over the 44% wanting it to remain at 80 km/h. Also, I don't feel the 57 questionnaires responses accurately reflect all the residents and users of these roads.
- Speed limit should be reduced to 60 km/h and enforced.
- 80 km/h is a realistic speed if enforced. Lowering the speed on a straight semi-rural road only invites speed violation. Improvements proposed make lower speed limited unnecessary.
- Police enforcement of speed limit for safety concerns. Speeding vehicle tore off school bus stop sign from out son's school bus in December 2002. See attached letter. ***(See Letter #1)***
- Polic control – make sure the posted speed limited is dropped to "70".
- Lower speed is no advantage at high traffic volume periods since it causes vehicles to bunch up (increase congestion).
- Do it now, not in 5 – 15 years.
- Majority of residents on previous survey stated that it should remain at 80 km/h.
- By changing and limited access on the RR's the County is encouraging more traffic to use these roads as a "but through" to Twp Rd. 522. Therefore they should be treated as any other high traffic road in Sherwood Park and the speed should be 60. These roads are no longer just for access to people living on them, which is the provinces' definition of a range road.
- People drive reckless down these 3 roads. I have lived on 232 since 1976 and have seen the changes and increase in accidents. By lowering the speed you may be able to reduce the speeders from 100 km/h down to 90 km/h. There is a comfort zone of keeping within 20 km/h of the speed limit.
- A lower speed limit is desirable – preferably to 60 km/h to give some protection to residents and wildlife. School bus stops should be signed at even lower limits.

ACCOMMODATING PEDESTRIANS

a) A 3m wide asphalt trail on one side of each of Range Roads 231, 232 and 233:

Do Not Support	Support	Don't Know
4	36	

Comments/suggestions:

- There is a great need for a trail on all of these roads and should be done as soon as possible. These roads are very dangerous because of the speed and no shoulders.
- Strongly support but would definitely want it started as soon as possible.
- Require safe method for walking and cycling.
- Should be a joint use trail i.e. bicycle, jogging, walking.
- Very good idea.
- Absolutely!
- It would be safer bikes and walking.
- I don't think there needs to be as much distance between the roadway and the trail as proposed.
- One side. See previous comments (You MUST put a walking path on the east side of RR 233. Surely those of us that have paid taxes for over 35 years for FEW services deserve this consideration, particularly when paths travel for miles thought the northern parts of Sherwood Park).
- Ridiculous timeline (10 – 15 years), we require this now (RR 231)!
- As long as it is on the west side of the range roads.
- West side please.
- We presently do a lot of bicycling on these roads and trails would be great.
- Do not feel that if traffic is so heavy to require major road changes that it is prudent to attract more foot or bike traffic.
- We need pedestrian trails ASAP. I got hit at night on RR 232 while biking. Although I have a light, the car did not move over far enough and its mirror clipped me. A mirror going over 80 km/h leaves a nice welt in the leg. Please make sure the trails go all the way from Wye Road to Twp Rd 522. Many bikers go along the Whitemud to get from one subdivision to the next. Stopping the trails shy of the Whitemud would be shortsighted and dangerous for the hundreds of residents who jog, walk their dogs, or bike each week throughout the year.
- A median or buffer separating trail from roadway should be considered.

IMPLEMENTATION SCHEDULE

A tentative implementation schedule has been identified. Please indicate your views regarding this schedule:

Do Not Support	Support	Don't Know
10	23	2

If you do not support the implementation schedule, please indicate your preferences on the attached blank schedule.

- Too slow.
- I do not support twinning of 233 at all. Everything else is workable.
- All supported except speed limits.
- I am quite disgusted that I was not notified about this project before this open house. It is quite clear that not enough effort was put into notifying residents. 57 questionnaires does not represent the tens of thousands of people that will be affected by these changes.
- See attached.

If you have any other comments, suggestions, or issues that you think should be addressed in this project, please bring them to our attention in the space below:

- But I feel the trail issue and speed limit reduction should be done ASAP. I also would like to see lights come in at Whitemud and RR 233 very soon.
- I think it would be wise to make a 3m wide trail along Wye Road as well. Also, the shoulder on Twp. Rd. 522 is too narrow; it is not safe for cyclists.

- I do not feel that 57 questionnaire responses accurately reflect the wishes of thousands of people affected by the changes proposed. I feel that notification in the past was not adequate. I am even more disappointed that decision would be made based on the 57 responses (speed limit changes). I feel that the information presented at the previous open houses should be re-presented and adequate notification given for this.
- It appears the County made a determined effort to route all traffic into these roads so an immediate correction is required. The issue of large trucks on these roads must be addressed immediately.
- If any twinning is going to take place on RR 233, it should all be twinned from Wye Road to 628 at the same – not only cost-saving, but life-saving!!! My main concern is access out of Chrenek Acres to Hwy 628. With even more traffic now, turning left can be very dangerous. DO NOT SUPPORT NEW ACCESS PLANNED IN CHRENEK ACRES!!!! How about residents' well being. After all we do pay "County taxes"!
- Having two access roads out of Chrenek Acres onto 233 isn't very good if you want to get out to 628. You have to turn left crossing traffic. Why not leave the one access road open on 628 to turn right only when 628 is twinned?
- I would like to see a trail for pedestrians/cyclists also along Wye Road.
- Pedestrian roads should be done immediately because of danger. Traffic lights needs advance green to turn south on Wye Road and RR 232.
- Cost of improvements? How will they be funded? Accommodation for traffic during construction period?
- Our greenhouse on 231 would be seriously impacted if construction occurred from March 1 to June 30. See attached letter. ***(See Letter #1)***
- A bloody waste of time without Wye Road in the equation.
- In the presentation, the new access into South Chrenek Acres has been should even though we have been told the County does not support this change. This sends mixed messages. If this change does ahead and the access in 522 is closed, I feel that because of the increase in traffic that is estimated for 233 combines with the traffic lights at 233 and 522 (628), it is going to become near to impossible to turn left out of or into the subdivision even with a turning lane. Left out is going to be especially difficult because our access roads will be directly across from Aspen heights access. Keeping the access on 522 as a right in right out only is a viable solution.
- We need the asphalt trails ASAP! I am a school teacher and while driving to school in Sherwood Park, I see elementary, junior and senior high students blading, biking, and boarding amongst traffic to their schools. Many times the kids are not on the shoulder but in the lane when cars are not near. In the evenings, I witness ladies pushing baby carriages and people riding horses on the skinny inadequate shoulder RR 231, 232 and 233 provide. RR 232 is a death trap waiting to happen. My neighbor in Carriage Lane is already cutting the grass along 232 so people have a path to walk on since the road is dangerous. He told me he would gladly allow the County to snip away at his bushes to allow for a bike path!
- A lower speed along 233 should be introduced to cut down on non-residents using this route as a cut-off and speedway to circucy navigate using the Wye freeway. If the Wye cannot accommodate the traffic, then the Wye freeway should be widened.

Part 3: About This Open House

1. The quality of the information displays was:

Poor – 1	2	3	4	Excellent - 5
1	1	13	19	3

Comments/suggestions:

- Found many of the charts to be misleading such as the one for the speed limit. See comments on previous page (I do not feel that 57 questionnaire responses accurately reflect the wishes of thousands of people affected by the changes proposed. I feel that notification in the past was not adequate. I am even more disappointed that decision would be made based on the 57 responses (speed limit changes). I feel that the information presented at the previous open houses should be re-presented and adequate notification given for this). Also, would have liked to see how Highway 628 is affected between these range roads.
- Presentation was good, but information was poor.
- Found the presentation not clear.
- A handout of the proposed road maps would have been very useful.
- I worked and thus could not attend the open house.

2. Notification about the Open House was:

Poor – 1	2	3	4	Excellent - 5
		3	16	22

How did you hear about this event

Newspaper	5
Mail Out	18
Other	

Comments/suggestions:

- I am very disappointed to find that this was the 3rd open house. We were not notified of the other 2. The fact that only 57 questionnaires were returned in the past (and decision made from them) shows that notification of the previous open houses was not adequate.

3. The Open House Venue was:

Poor – 1	2	3	4	Excellent - 5
	2	8	20	6

Comments/suggestions:

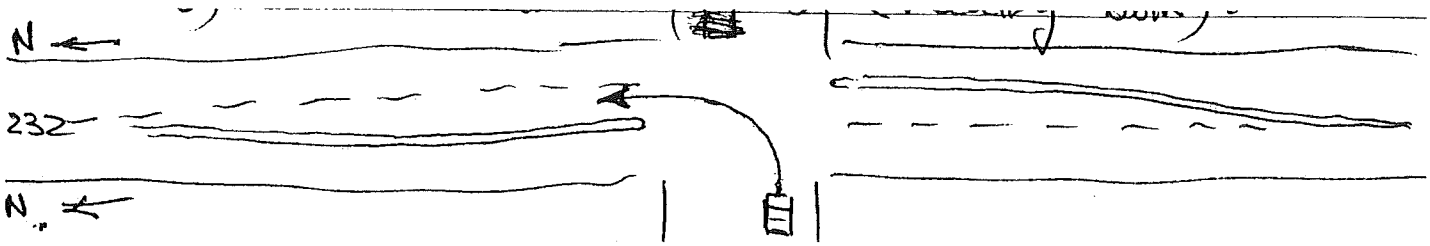
- Closing at 7:00pm is too early. Please stay open until at last 8:00pm or 8:30pm.

4. Staff were able to answer your questions to your satisfaction

Not at all - 1	2	3	4	Fully - 5
3	5	4	13	9

Comments/suggestions:

- Lack of knowledge about Strathcona bylaws, etc. Lots of "I don't know…" or "I'm not sure…". AM NOT IMPRESSED!
- Didn't ask any.
- N/A.
- Yes, but definitely not ideal.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232
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Carol and Darrel Maier
52043 Range Road 231
Sherwood Park

467-5784 Fax 449-5576

April 22, 2003

To: Whom it May Concern

Re: The widening of Range Road 231 from Wye Road to Hwy 628

My husband and I believe that Range Road 231 needs to be widened for safety issues.

The following are reasons as to why we believe such road widening should occur.

1. In December 2002 our son was getting on his morning School bus. The School bus had its flashing red lights on and the stop sign extended from the driver's side.
As our son was stepping up onto the bus a speeding vehicle came so close to the bus that the stop sign was torn off of the bus. The vehicle did not stop and a license plate number could not be taken down, due to the vehicle's extreme speed.

2. The intersection of Range Road 231 and Township Road 520 is a high-accident location and several deaths resulting from vehicle accidents have occurred at this location.

I strongly suggest a "stop ahead sign" be placed on Twp 520 east of 231. I believe accidents occur at this location due to speed but also because of the fact Twp 520 has no stop signs from Collingwood Cove until Hwy 21. Why would drivers expect another stop sign at the next Range Road when the ten previous intersections prior to Hwy 21 had no stop signs?

3. We cannot bike or walk safely on Range Road 231 south of Twp 521. The Road is dangerously narrow and one ends up walking on the invisible shoulder, or in the ditch.

4.The base of the road is wide, however problems occur as the top of the road becomes 3 to 6 inches narrower every time a layer of asphalt is applied.

Darrel and I, both feel that Range Road 231 needs to be widened, However, we also have concerns, and anticipate that Strathcona County will be address these concerns.

1. We own and operate Country Road Greenhouses which is located on Range Road 231. The greenhouse is located south of where Range Rd 231 becomes dangerously narrow.

Customers and employees have made comments regarding how narrow the road suddenly becomes.

2. The property, when we purchased it in 1998, had three driveways. We have made several improvements to the driveways at our own expense in order to compensate for the narrow road.
These improvements were made due to safety concerns of delivery drivers who could not get onto the greenhouse property due to the narrow road and narrow driveway. On several occasions we ended up unloading on Range Road 231, or the driver would spend 20 minutes maneuvering his semi into the narrow driveway, from the narrow road. The driveways were widened but the road remains narrow.

3. At our own expense the driveways have been built up, and several loads of gravel applied, to take away the steep grade from the parking lot to the driveway to Range Road 231.

4. Trees, deadfall and a mini garbage dump were cleared to make the property more visually accessible. By removing the trees, clients entering and exiting can now see and be seen by traffic on the road and in the parking lot.

5. Again at our expense we made a clay burm parallel to the road and have added topsoil and planted perennials. The burm is the same height as the road with a four to five foot deep ditch between the road and burm. We have invested time and money into making our Greenhouse location visually appealling.

6.Our Greenhouse is operational from March 1 to June 30 each year. Any construction during this time would have a serious, negative financial impact on us. The power poles are located on the east side of Range Road 231. During Construction of the Road widening, all power interruptions which cause loss in plant production, will be charged back to the party causing the power interruption.

7. In 2000 we added 2 gutter connect greenhouses. In order to receive our development permit our parking lot was measured several time to ensure it was wide enough and long enough to accommodate the increased parking requirements. When the road is widened what will happen to our parking lot?

8. Easement is also a concern. I understand that Township Road 520 had large easements which many residents felt were unnecessary. What is the expected easement for the widening of Range Road 231?

Range Road 231 needs to be widened for safety reasons. We have serious concerns regarding easement, construction (-not to occur between March 1 and to June 30), the greenhouse parking lot, and improvements made to our three driveways such as its widening and building up.
I
Our current personal expectation is that we are provided with a contact name and phone number in order that a working relationship can be built, concerniong planning and construction process of Range Road 231's widening.

We thank you for considering our concerns and look forward to receiving correspondence with a designated individual.

Carol Maier

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