Appendix A:
Functional Design Report

FUNCTIONAL DESIGN STUDY

FOR

PTH 39

PREPARED FOR: REGION FIVE

PREPARED BY : REGION ONE

WRITTEN BY: KURT FEY AND
DAVE LANGRILL

MARCH 2003

EXECUTIVE SUMMARY

A Functional Report was conducted to solve the existing geometric design problems for the study area of PTH 39. The recommended solution for the study area is known as Option Three. This option requires construction of a new grade with a bituminous surface eliminating the existing 'W" alignment. The estimated cost of this new alignment is $ 5.09 million.

TABLE OF CONTENTS

LIST OF FIGURES

1.1 STUDY HISTORY

Region One was requested by Region Five to do a Functional Design on a section of PTH 39. The study included reviewing the existing alignment and determining a preferred Option based on engineering, environmental and socio-economic criteria.

PTH 39 is an important route for access between the community of Thompson and destinations to the western central part of the province.

1.2 STUDY AREA

PTH 39 serves as the East-West route between PTH 6 and PTH 10. The total length of the highway is approximately 164 km. The section being considered for re-construction is 4.5 km West of PR 596 to 10.0 km East of PR 596. The length of the section involved in the proposed re-construction is approximately 14.3 km. The study area includes the surrounding area of PTH 39 that would be impacted by road realignments. The highway right-of-way is under jurisdiction of Manitoba Transportation and Government Services along the existing PTH 39 but, in the case of realignment of the route, the proposed right-of-way will have to be acquired and reserved from the crown.

(See Figure 1.2 A)

1.3 STUDY GOAL AND OBJECTIVES

The goal of this study was to prepare a functional plan for upgrading PTH 39 within the study area. The completed functional plan is to serve as a tool to guide future development within and adjacent to the study area.

The objectives of the study were to:

- Review the existing alignment and recommend a preferred option based on engineering, environmental and socio-economic criteria.
- Submit an Environmental License for the reconstruction.
- Submit a current Geometric Design Criteria for the proposed alignment.
- Submit the proposed R.O.W. through Crown Land Reservations.
- Develop a reliable estimate on the proposed alignment.

The functional plans will show:

- Proposed closure of any existing highways.
- A new intersection at the junction of PTH 39 and PR 596, if required.
- The access to the Manitoba Marble Quarry, located on PR 596.

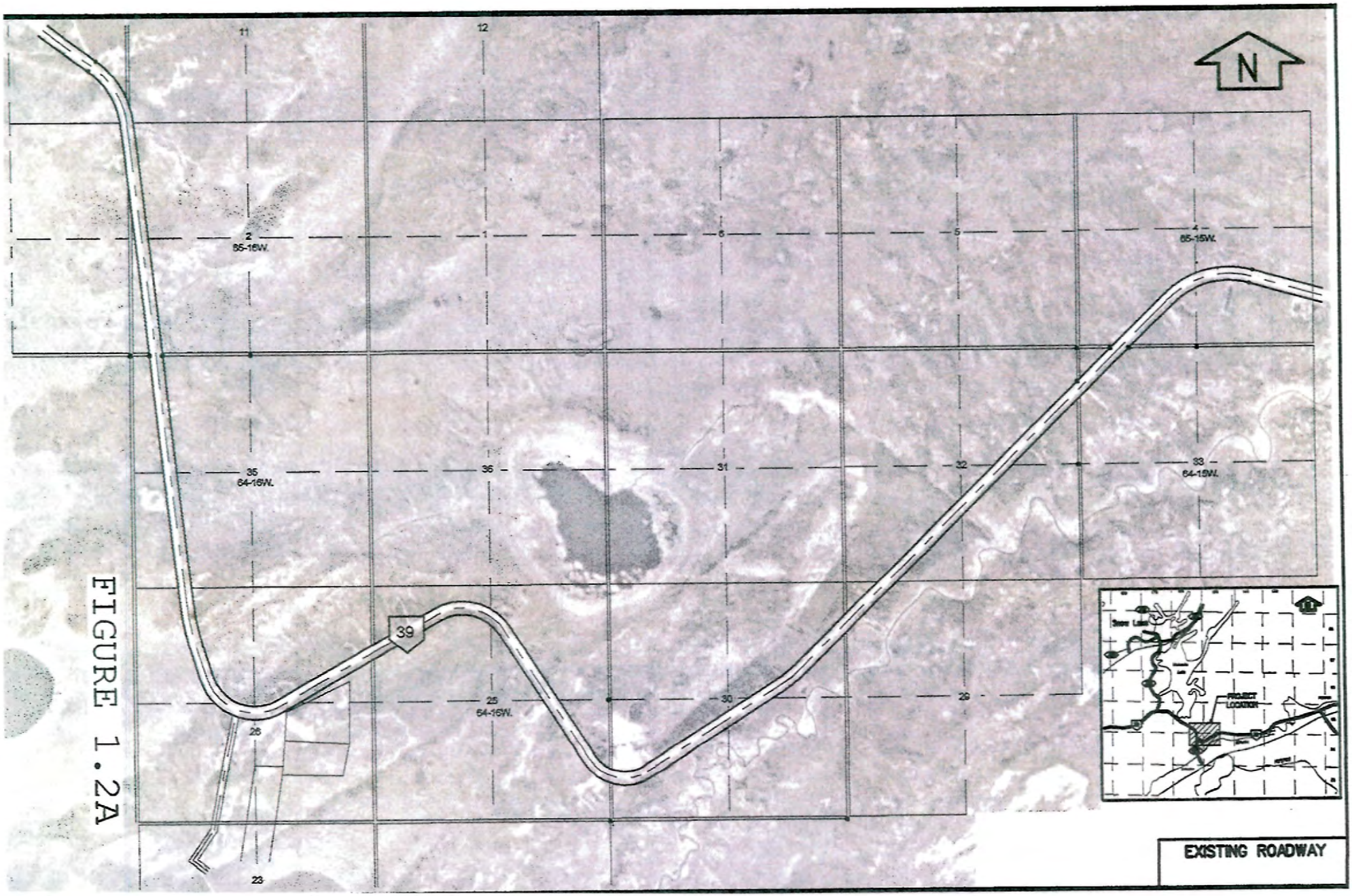
N
11
12
2
65-16W.
1
6
5
4
65-15W.
35
64-16W.
36
31
32
33
64-15W.
25
64-16W.
30
29
26
23
39
PROJECT LOCATION
EXISTING ROADWAY

FIGURE 1.2A

The study was carried out in accordance with the previous work and investigations done by Region Five staff, with modifications made as the study progressed.

The activities carried out by the Region One team were:

Study Initiation/ Data Collection

Study Initiation – preliminary meetings were held between Region Five and Region One committees to introduce, discuss and refine the goals, objectives and work plan of the study.

Data Collection –all existing and available information about the study area were obtained and reviewed (including highway plans and profiles, traffic volumes and collision history, environmental and land ownership issues, legal and air photo plans, soil and field surveys, drawings and reports, land use and population of the area).

Preliminary Engineering

Mapping – all constraints within the study area affecting the selection of a functional horizontal alignment were identified and plotted onto a base plan.

Traffic – traffic conditions and collision history of the study area, including the intersection at PR 596 were evaluated. Traffic reports for PR 596, accesses, and land use needs along the right of way were reviewed. Traffic growth rates were estimated to determine future volumes on a 20-year planning horizon. This information was gathered for use in traffic analysis and future traffic plans.

Development and Evaluation of Alternatives

Development of Alternatives – four alternative alignments and cross-sections were developed for PTH 39, together with Geometric Design Considerations.

Evaluation of Alternatives – alternatives were analyzed based on a weighted-mean evaluation consisting of engineering, environmental, and socio-economic criteria. The evaluation process resulted in a selection of a recommended alternative for the study area.

Functional Design

Functional Design – functional plans were prepared for PTH 39 and an "order of magnitude" cost estimate was developed for the recommended alternative.

The ongoing liaison between Region One and Region Five was through a project steering committee, which included;

Region One

Director of Regional Operations	Jack Gottfried, P. Eng.
Technical Services Engineer	Walter Burdz, P. Eng., MBA
Construction Engineer	Larry Halayko, P. Eng.
Acting Regional Design Engineer	Dennis Watson, P. Eng.
Senior Project Manager	Marc Gosselin
Project Supervisor	Dave Langrill
Engineering Aid	Kurt Fey

Region Five

Acting Director of Regional Operations	Doug McMahon, P. Eng., CIM
Construction Engineer	Brett Wareham, P. Eng.
Senior Project Manager	Craig Howell

2.1 GENERAL

The first step undertaken in developing a functional design for the study area was to specify the existing conditions. A meeting was set up by Region Five to provide the existing conditions of the study area to Region One. After the meeting, a site investigation was done by Region One engineering staff to understand the geometrics, terrain and environmental conditions of the area. Once the existing data for the study area was assembled, it was then analyzed to find the best possible solution to solve the problem that the existing study area had presented.

2.2 BASE DATA

2.2.1 RECORD DRAWINGS AND EXISTING ROADWAY GEOMETRICS

All drawings, profiles and plans were supplied and/or developed by Region One and Region Five with assistance from the Winnipeg Land Titles Office (W.L.T.O.).

The existing features of the roadway include:

- Classification – Primary Arterial
- Terrain – Rolling
- Design speed – 100
- Max gradient – 1.2%
- Lanes – 2 at a width of 3.7 m each
- Minimum Vertical 'k'-value – 130
- Paved shoulder width – 1.0 m
- Width of R.O.W. – 91.44 m

2.2.2 UTILITIES

The sole utility in the study area is a Fibre Optic telephone line that runs along the north end of the study limits.

(See Figure 2.2.2 A)

2.2.3 PROPERTY OWNERSHIP

The majority of the land ownership is "crown". A small part of the study area is leased by W.B. Kobar on behalf of Manitoba Marble Quarry Company.

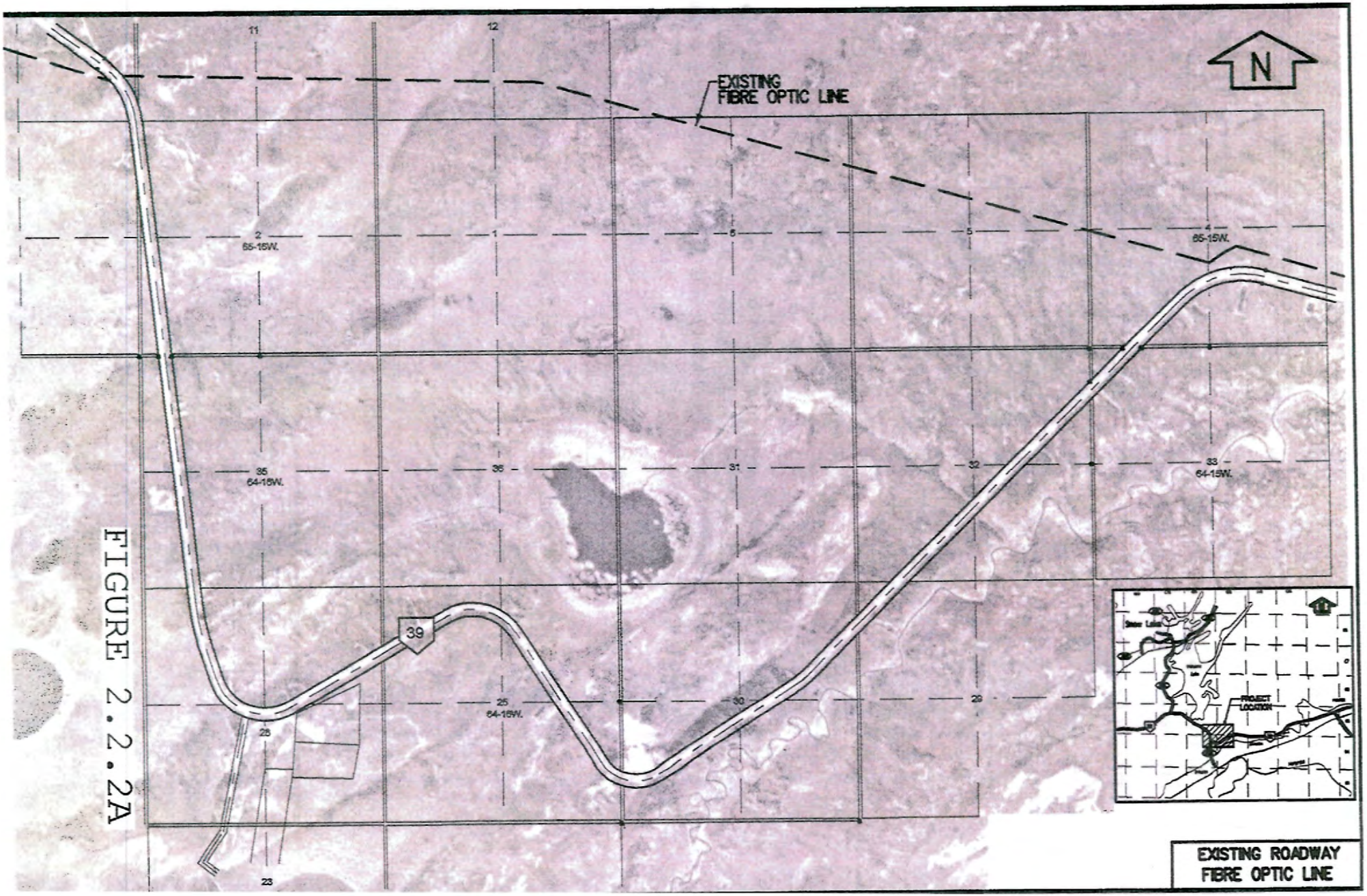
N
EXISTING
FIBRE OPTIC LINE
11
12
2
65-15W.
1
6
5
4
65-15W.
35
64-15W.
36
31
32
33
64-15W.
39
25
64-15W.
30
29
28
23
PROJECT
LOCATION
EXISTING ROADWAY
FIBRE OPTIC LINE

FIGURE 2.2.2A

2.2.4 STRUCTURES

The study area has nine existing corrugated steel culvert structures requiring replacement. They are as follows:

Pipe #	Pipe Size (mm)	East Inv. (m)	West Inv. (m)	Existing Sta. (m)	Length (m)
1	750	277.307	277.246	1103.181	26
2	750	275.478	273.832	1634.047	40
3	900	273.771	273.528	2951.088	36
4	900	270.784	270.297	6106.567	37
5	900	271.394	271.150	6112.663	31
6	900	270.053	269.870	8195.838	43
7	600	273.223	273.528	9314.977	38
8	900	260.726	261.275	10075.507	46
9	1500	261.762	261.518	12546.276	48

There is a 3 – span timber bridge structure site (# 1539) crossing the Mitishto river on PR 596 that was built in 1979. It has a design loading class HS20. The bridge is 100.5 ft. long and has a road width of 24 ft. It's made up of timber piles with a 2x4 timber deck, covered with an asphalt overlay.

(See Figure 2.2.4 A)

2.2.5 DRAINAGE

The drainage patterns of the study area all flow southeast and eventually in to the Mitishto River that flows on a Northeast pattern.

(See Figure 2.2.5 A)

2.2.6 AERIAL PHOTOGRAPHS

Aerial Photographs were obtained from Manitoba Conservation. These photos were used to identify design constraints, existing roadway layouts, and environmentally-sensitive sites in the study area.

2.3 POPULATION AND LAND USE

2.3.1 POPULATION

The population of the study area is assumed to be zero.

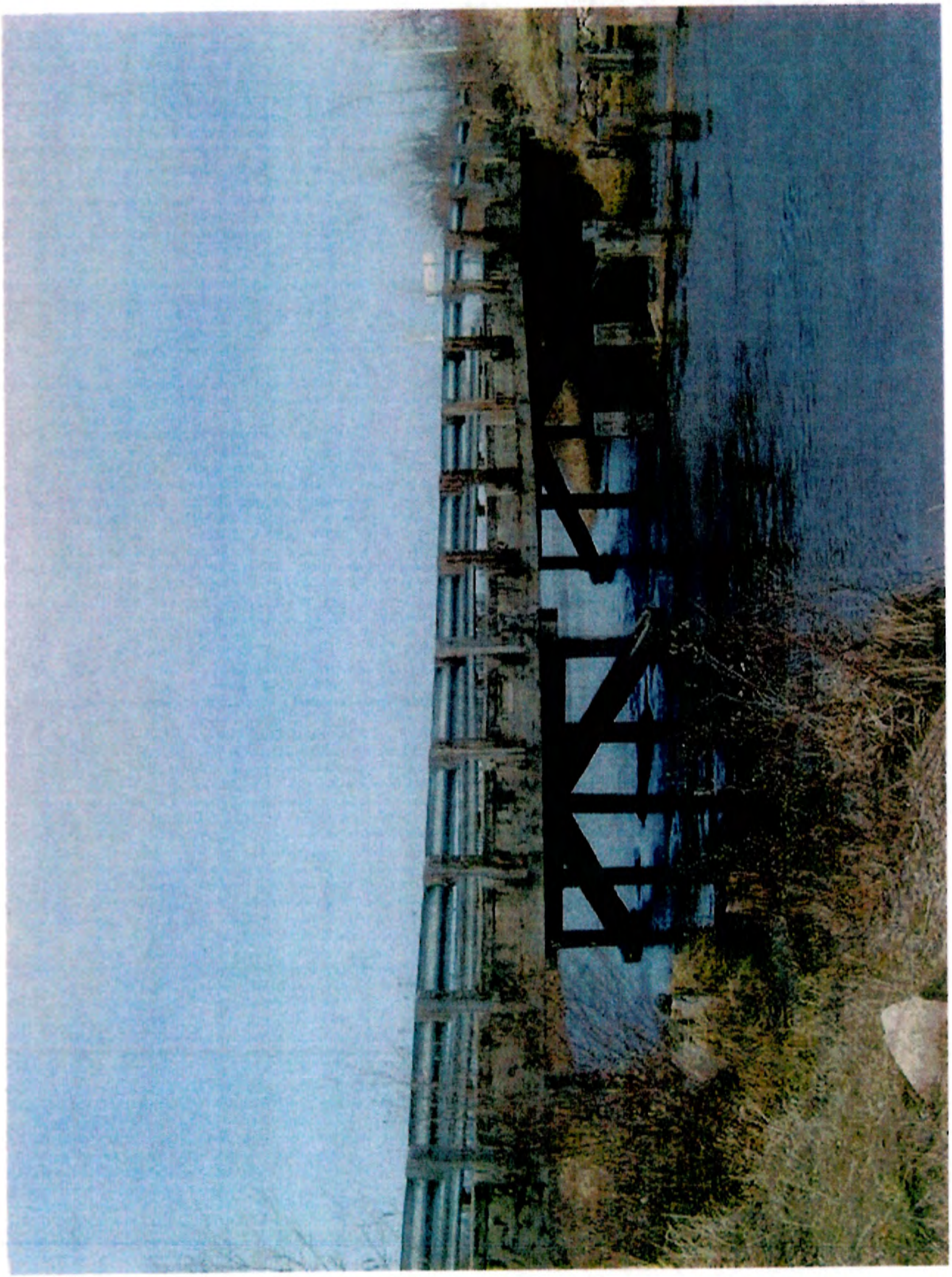

FIGURE 2.2.4 A

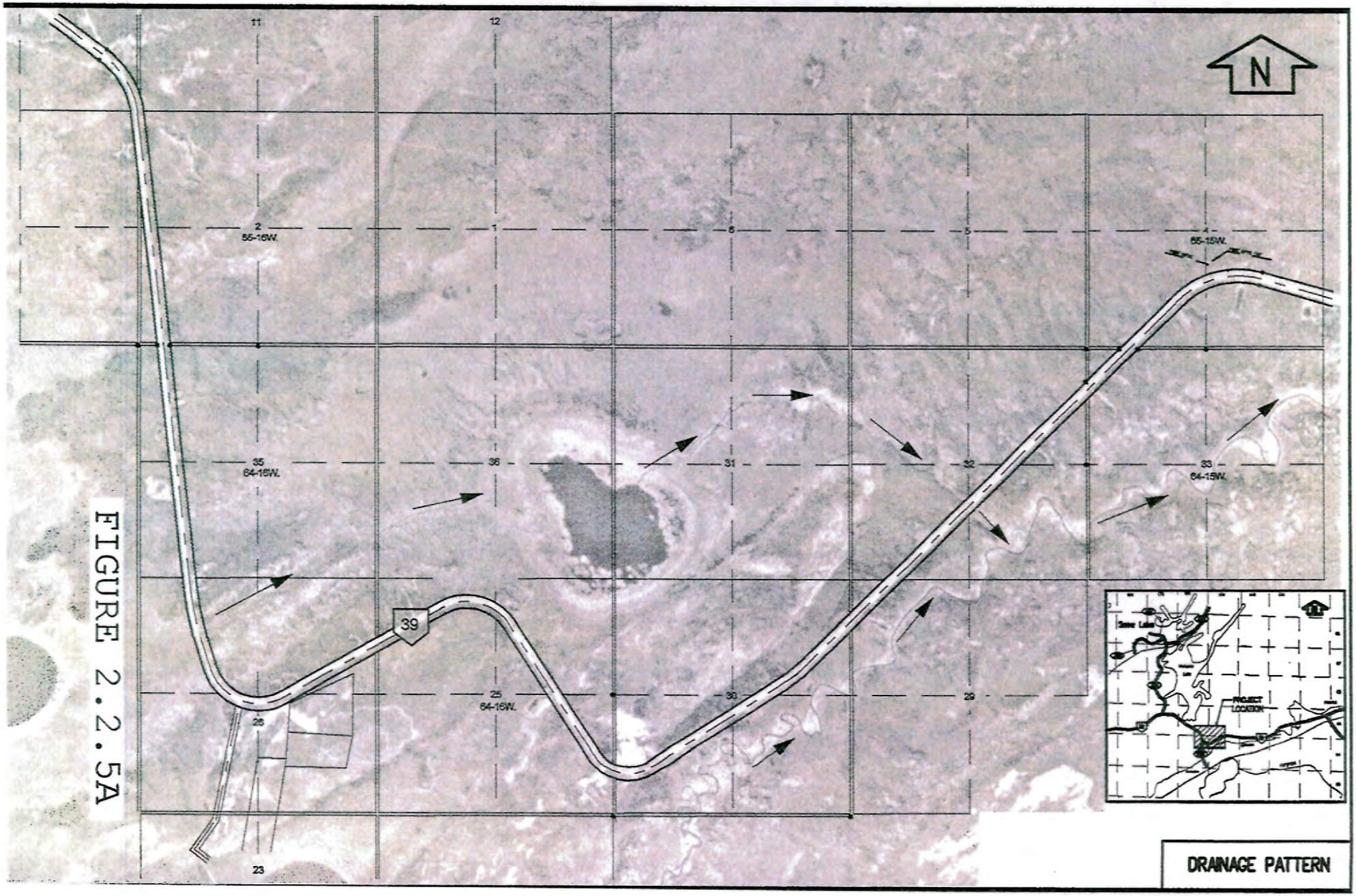
N
11
12
2
55-16W.
1
6
5
4
55-15W.
35
64-16W.
36
31
32
33
64-15W.
39
25
64-16W.
30
29
26
23
PROJECT LOCATION
DRAINAGE PATTERN

FIGURE 2.2.5A

2.3.2 LAND USE

The stakeholders within the study area were determined to be:

- Hudson Bay Railway
- Conservation
- The Town of Snow Lake
- The Town of Flin Flon
- W.B. Kobar (Manitoba Marble Quarry Lease)

2.4 TRAFFIC STUDIES

From past traffic studies relevant traffic information was determined to be:

- AADT 170 (2001)
- Growth factor of 1.5%
- Trucks 14%

2.5 PTH 39 – REVIEW OF EXISTING CONDITIONS

2.5.1 ALIGNMENT AND CROSS-SECTION

The study area of PTH 39 consists of a "W" configuration with five horizontal curves that do not meet current departmental geometrical standards. The five curves are substandard due to the 70 km/h design speed. The highway also consists of inadequate shoulder widths of approximately 1.0 metre.

(See Figure 2.5.1 A)

2.5.2 PR 596 INTERSECTION

The alignment of this existing intersection is geometrically substandard, as its location falls on a curve.

(See Figure 2.5.2 A)

2.5.3 THE ROADSIDE

The safety of the roadside is very critical for our highways; the hazards that exist throughout this study area include:

- Very steep side slopes throughout the project that reduce or eliminate the ability of a vehicle leaving the roadway to safely recover.
- Non-existent rounding for transition from existing shoulders to roadside ditch slope.
- Unprotected culverts throughout the project.

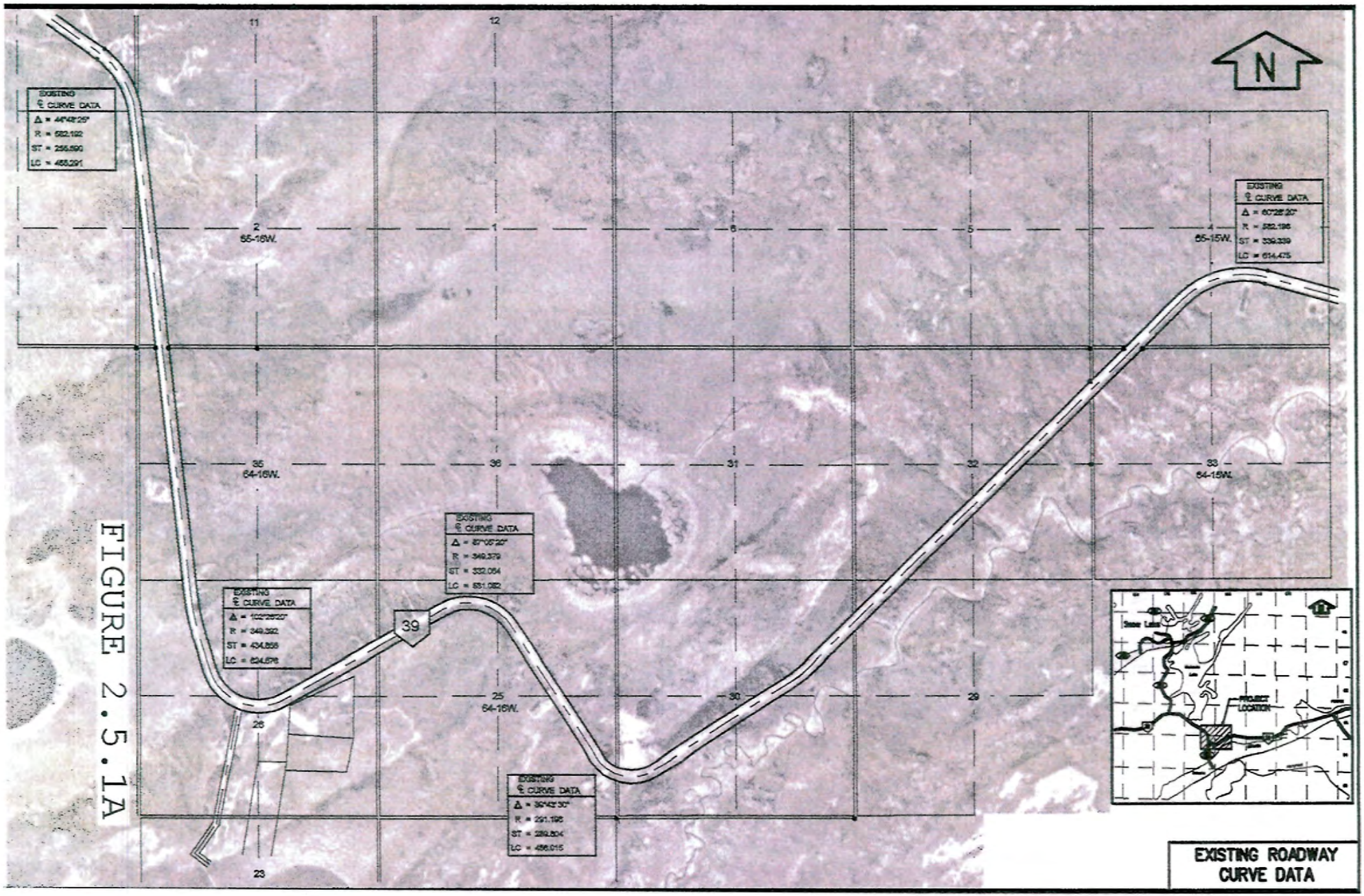
N
EXISTING
℄ CURVE DATA
Δ = 44°48'25"
R = 582.192
ST = 255.590
LC = 455.291
EXISTING
℄ CURVE DATA
Δ = 87°05'20"
R = 349.379
ST = 332.054
LC = 531.082
EXISTING
℄ CURVE DATA
Δ = 102°26'27"
R = 349.392
ST = 434.858
LC = 624.676
EXISTING
℄ CURVE DATA
Δ = 30°42'30"
R = 291.196
ST = 289.804
LC = 456.015
EXISTING
℄ CURVE DATA
Δ = 60°26'20"
R = 582.196
ST = 339.339
LC = 614.475
11
12
2
65-16W.
1
6
5
4
65-15W.
35
64-16W.
36
31
32
33
64-15W.
25
64-16W.
30
29
26
23
39
Swan Lake
PROJECT LOCATION
EXISTING ROADWAY CURVE DATA

FIGURE 2.5.1A

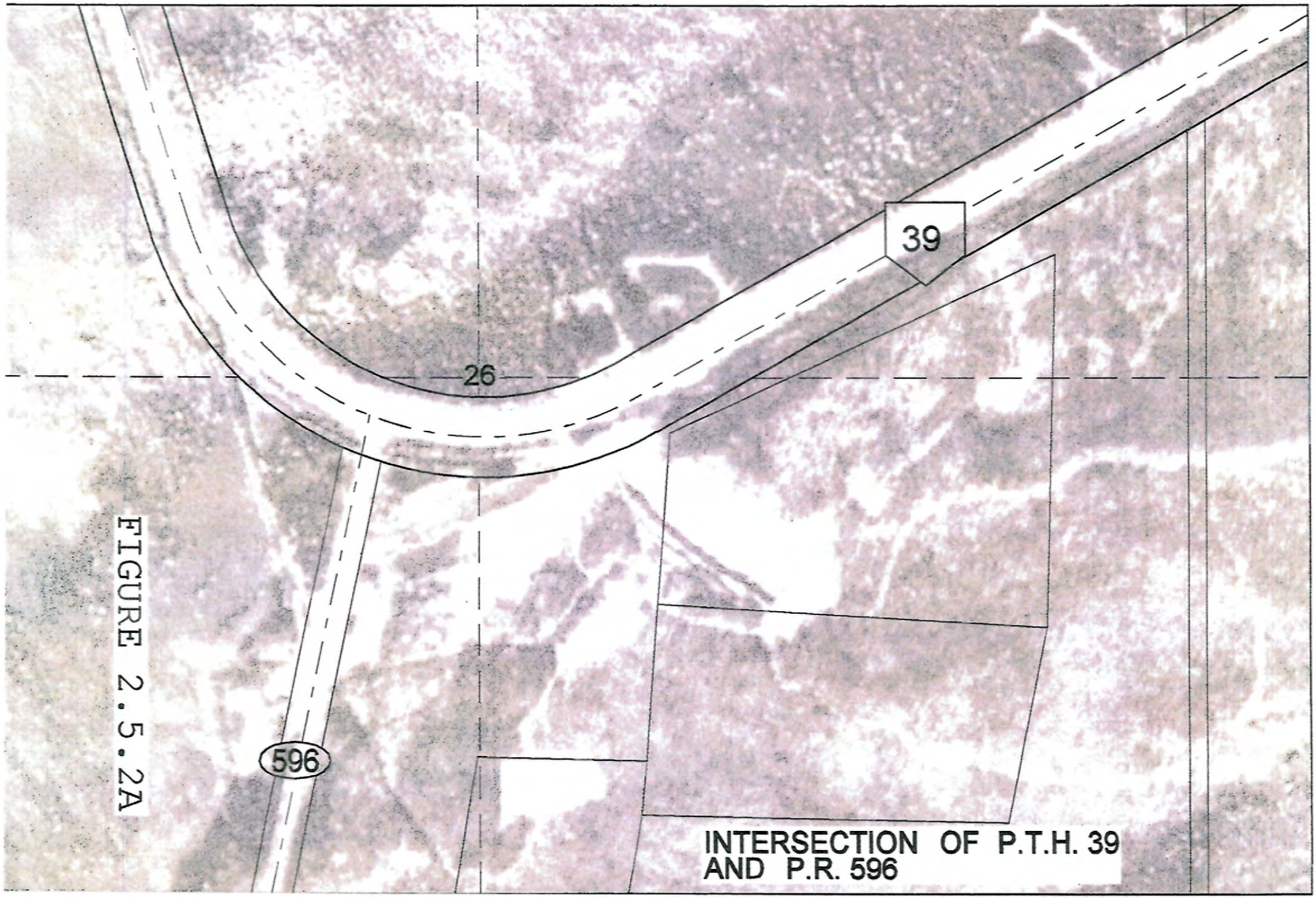

FIGURE 2.5.2A

INTERSECTION OF P.T.H. 39
AND P.R. 596

2.5.4 PAVEMENTS

Pavements were found to be in poor condition, with an average pavement rating of 51 throughout the study area. Rehabilitation will be required in the near future.

3.1 GENERAL

Traffic flow on PTH 39 is largely attributable to the highway's function as the main route between the two largest urban communities in the northern part of the province, The Pas and Thompson.

Historical traffic data for the study area was provided by the Department's Traffic Engineering Branch (T.E.B.).

For this study, traffic forecasts were generated for an analysis period of 20 years (2001 to 2021).

3.2 TRAFFIC COLLISIONS

Collision data was obtained from T.E.B.'s collision data base, for the six year period from 1995 to 2000. Data showed that eleven collisions had taken place.

(See Figure 3.3 A and Figure 3.3 B)

Case No.	Date	Day of Week	Time	Severity	Configuration	Highway No.	Control Section	KM	Intersection I.D.	No. of Vehicles Involved	Accident Scene Speed Limit	Travel Direction	Major Accident Contributing Factors		
757314	1997/12/05	Friday	08	Damage	12	39	5039040	12.7		1	100	E	104	200	403
502792	1995/12/09	Saturday	08	Damage	12	39	5039040	13.1		1	100	W	403	N	N
863621	1998/10/12	Monday	16	Damage	12	39	5039040	15		1	100	N	N	N	N
681275	1997/06/20	Friday	16	Injury	13	39	5039040	16.9		1	100	W	115	213	300
629223	1996/07/31	Wednesday	08	Damage	13	39	5039040	17.8		1	100	N	100	200	300
590784	1996/11/29	Friday	10	Damage	99	39	5039040	18	39/596	1	080	S	401	N	N
512954	1996/04/20	Saturday	18	Injury	13	39	5039050	2		1	100	E	403	406	N
549268	1996/08/08	Thursday	06	Injury	12	39	5039050	3.5		1	090	W	104	308	403
698474	1997/08/01	Friday	14	Damage	13	39	5039050	4.7		1	100	S	200	115	N
749960	1997/12/05	Wednesday	16	Damage	12	39	5039050	5.7		1	100	N	403	104	200
496580	1996/02/17	Saturday	15	Damage	12	39	5039050	7		1	100	E	403	N	N
814747	1998/05/14	Thursday	18	Damage	13	39	5039050	7.8		1	100	W	115	200	300

FIGURE 3.3 A

ACCIDENT CONFIGURATION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	99
Rear End	Head On	SideSwipe	Side Swipe	Over-Taking	Right Turn	Right Turn	Left Turn	Left Turn	Left Turn	Inter-Section 90°	Off Road Right	Off Road Left	Fixed Object	Parking	Pedestrian	Other Explain in Police Comment Section

HUMAN CONDITION
200. (Apparently Normal)
201. Loss of Consciousness/Blackout Prior to Accident
202. Extreme Fatigue/Fell Asleep
203. Defective Eyesight
204. Defective Hearing
205. Medical Disability
206. Physical Disability
207. Mental Disability
208. Mental Confusion/Inability to Remember
209. Sudden Illness
210. Ability Impaired by Alcohol
211. Ability Impaired by Drugs
212. Had Been Drinking/Suspected Alcohol Use
213. Distraction/Inattention
214. Exceeded Hours of Service (Commercial Drivers Only)

VEHICLE CONDITION
300. (No Apparent Defect)
301. Defective Brakes
302. Defective Steering
303. Defective Headlights
304. Defective Brakelights
305. Defective Lighting (Unspecified)
306. Defective Engine Controls/Drive Train
307. Defective Suspension/Wheels
308. Defective Tires
309. Tow Hitch/Yoke Defective
310. Defective Exhaust System
311. Hood/Tailgate/Door/Covering Opened
312. Defective Glazing (Obscured Windows)
313. Vehicle Modifications
314. Fire
315. Overloaded/Oversized
316. Load Shifted/Spilled
317. Jack-Knife/Trailer Swing
318. Hydroplaning of Tires

ENVIRONMENTAL
401. Animal Action - Wild
402. Animal Action - Domestic
403. Slippery Road Surface
404. Snow Drift
405. Obstruction/Debris in Roadway
406. View Obstructed/Limited
407. Glare/Reflection
408. Construction Zone
409. Defective Driving Surface
410. Shoulders Defective
411. Lane Markings Inadequate
412. Defective/Inoperative Traffic Control Device
413. Weather
414. Pedestrian Corridor In Use
415. Uninvolved Vehicle
416. Uninvolved Pedestrian
417. Presence of Prior Accident

MAJOR CONTRIBUTING FACTORS
DRIVER ACTION
100. (Driving Properly)
101. Following Too Closely
102. Turning Improperly
103. Exceeding Speed Limit
104. Driving Too Fast for Conditions
105. Unsafe Operating Speed (Too Fast or Too Slow)
106. Passing Improperly
107. Changing Lanes Improperly
108. Failed to Yield Right of Way
109. Disobeyed Traffic Control Device/Officer
110. Driving Wrong Way on Roadway
111. Passing a Vehicle at Pedestrian X-Walk
112. Backing Unsafely
113. Parking Improperly
114. Careless Driving
115. Lost Control/Drive Off Road
116. Driverless Vehicle Ran Out of Control
117. Leave Stop Sign Before Safe to Do So
118. Failed to Signal
119. Taking Avoiding Action
120. Driver Inexperience
121. Pedestrian Error/Confusion

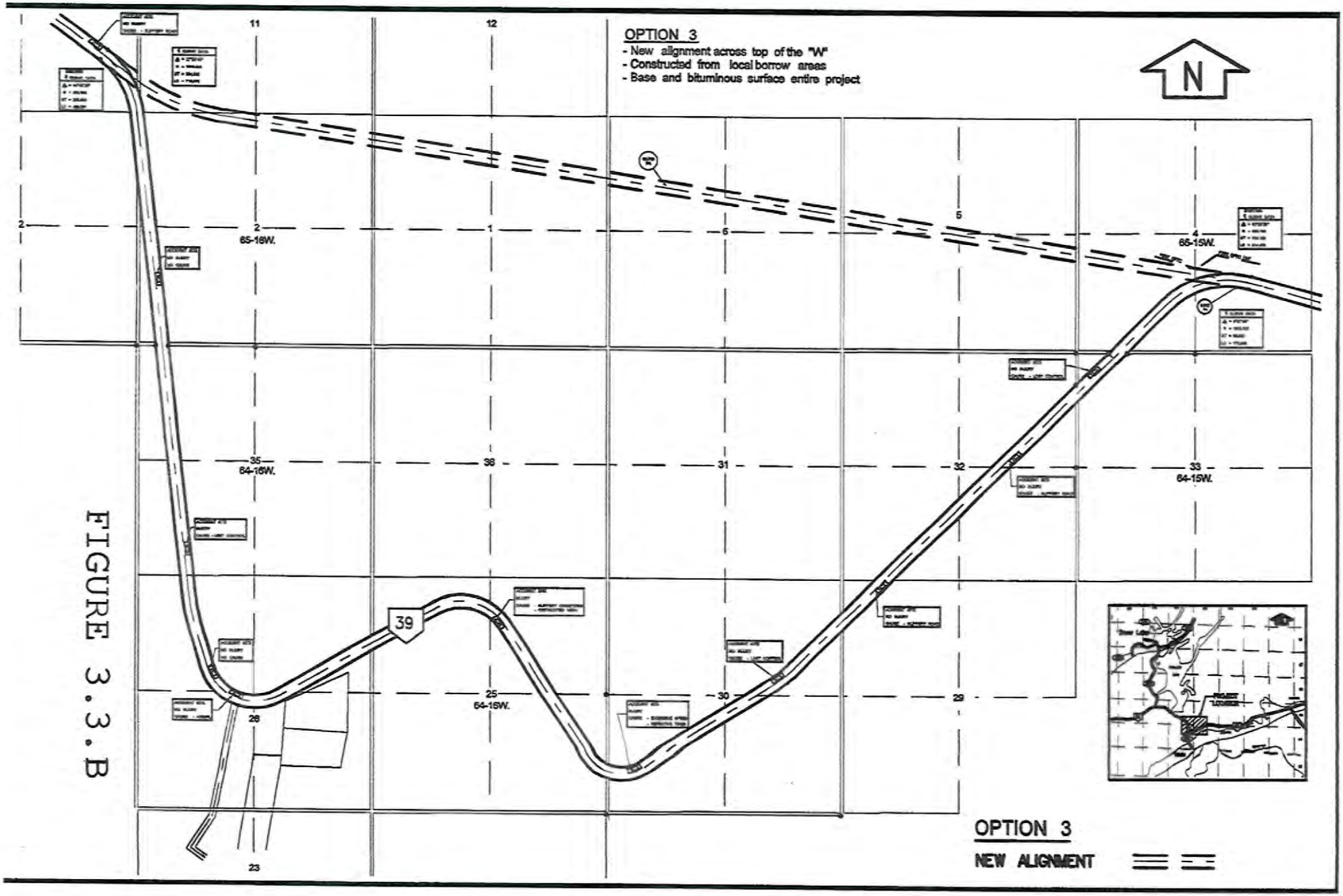
OPTION 3
- New alignment across top of the "W"
- Constructed from local borrow areas
- Base and bituminous surface entire project
N
11
12
2
1
6
5
4
65-16W.
65-15W.
35
36
31
32
33
64-16W.
64-15W.
39
25
30
29
26
23
OPTION 3
NEW ALIGNMENT

FIGURE 3.3.B

4.1 GENERAL

An airphoto analysis was undertaken to identify natural/topographical constraints. The second step in finding constraints was investigating all stakeholders and utility companies in the area. With this information, Region One found that the following constraints exist within the study area:

- A marble quarry at the southwest limits of the study area.
- A limestone quarry on the north side of the roadway at the southeast limits of the study area.
- The MTS Fibre optic line located at the north limits of the study area.
- The Sunday Lake located in the central area of the study limits.
- The Mitishto River located south of the study area.

(See Figure 4.1 A)

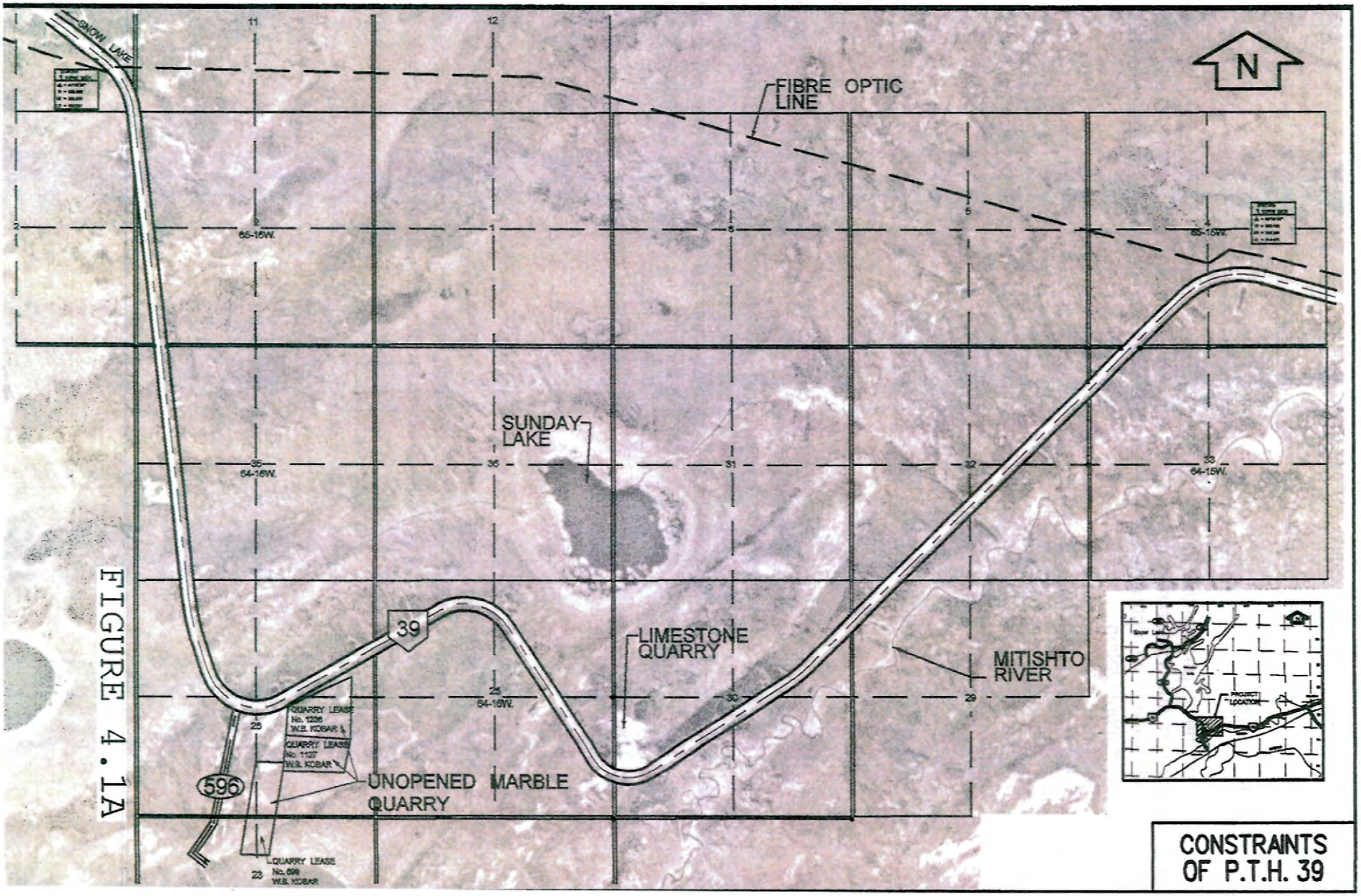

FIGURE 4.1A

CONSTRAINTS OF P.T.H. 39

5.1 GENERAL

For the purpose of this functional design, four options were developed to address the current sub-standard geometrical design ("W" alignment) of the PTH 39 roadway. There will have to be a change in the alignment of PR 596, depending on the chosen alignment Option.

5.2 GEOMETRIC DESIGN CRITERIA

The Geometric Design Criteria (GDC) consists of existing conditions in the study area and the future standards to be designed for. The GDC package has been prepared for the study area and can be found attached ready for submittal.

5.3 PTH 39 ALIGNMENT OPTIONS

5.3.1 OPTION ONE

- Leave the two existing 582 m radius curves at the west and east ends of the project, shoulder widen and place bituminous surface.
- Re-align the substandard curves in the middle of the project to make the "W" configuration into a "U" shape with bituminous surface.
- This would result in 9.54 km of shoulder widening and 3.9 km of new construction.
- The finished surface would feature two 3.7 m paved lanes with a partially paved (0.8 m) shoulder, 2.5 m wide, with 4:1 grade slopes.
- This Option would require 32.75 ha of new right of way.
- Cost Estimate is $ 5,655,550.

(See Figure 5.3.1 A)

5.3.2 OPTION TWO

- Re-construct the two 582 m radius curves at the west and east ends of the project to make them both have a 750 m radius and bring them up to geometric standards.
- Re-align the substandard curves in the middle of the project to make the "W" configuration into a "U" shape and place bituminous surface.
- Shoulder widen and bituminous surface the remainder of the project.
- This would result in 8.78 km of shoulder widening and 4.97 km of new construction.
- The finished surface would feature two 3.7 m paved lanes with a partially paved (0.8 m) shoulder, 2.5 m wide, with 4:1 grade slopes.
- This Option would require 34.70 ha of new right of way.
- Cost estimate is $ 5,703,523.

(See Figure 5.3.2 A)

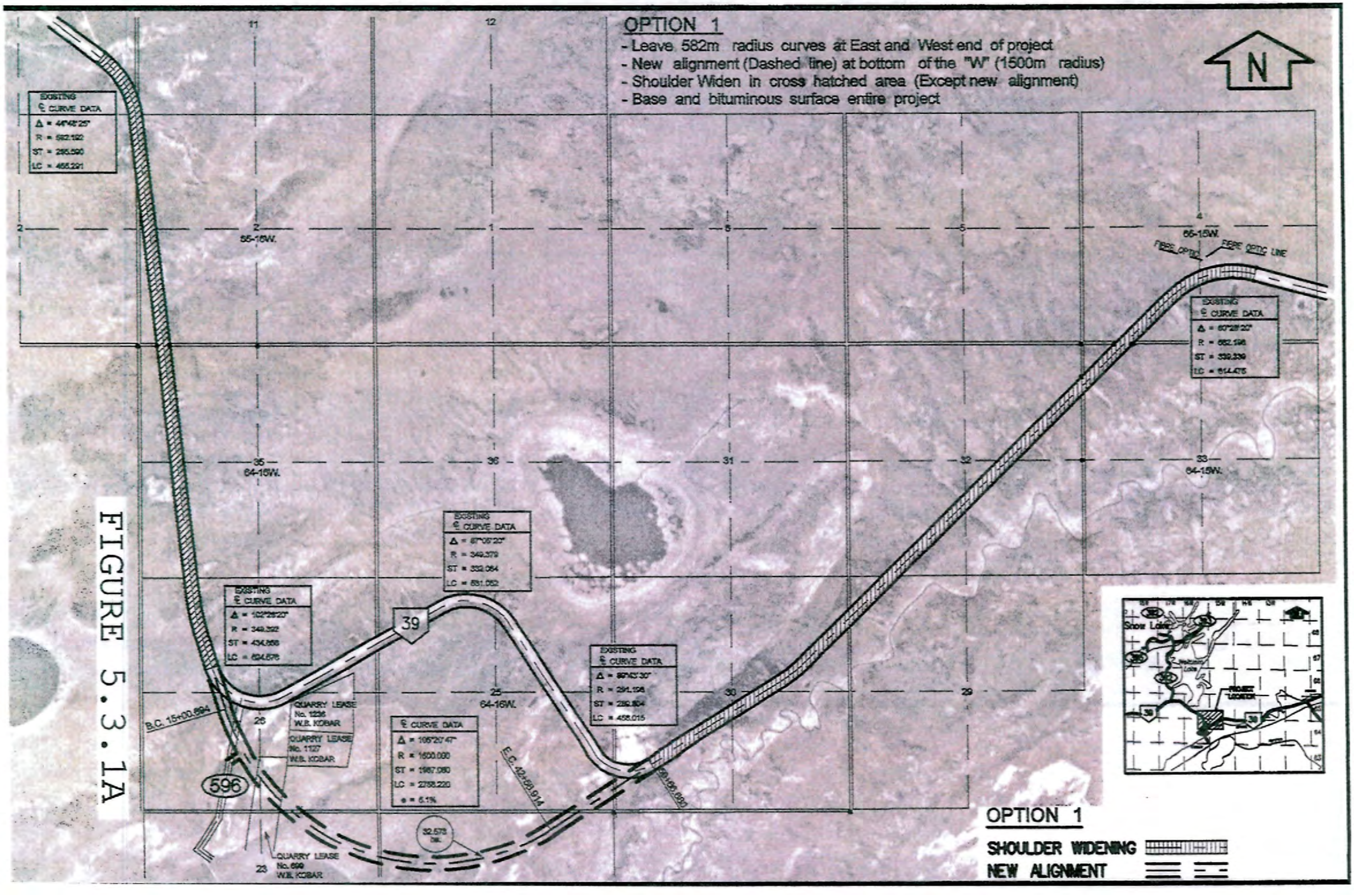
OPTION 1
- Leave 582m radius curves at East and West end of project
- New alignment (Dashed line) at bottom of the "W" (1500m radius)
- Shoulder Widen in cross hatched area (Except new alignment)
- Base and bituminous surface entire project
N
EXISTING
CURVE DATA
39
596
QUARRY LEASE
No. 1236
W.B. KOBAR
QUARRY LEASE
No. 1127
W.B. KOBAR
QUARRY LEASE
No. 699
W.B. KOBAR
B.C. 15+00.894
E.C. 42+58.914
55-16W.
64-16W.
64-15W.
65-15W.
FIBRE OPTIC LINE
Snow Lake
OPTION 1
SHOULDER WIDENING
NEW ALIGNMENT

FIGURE 5.3.1A

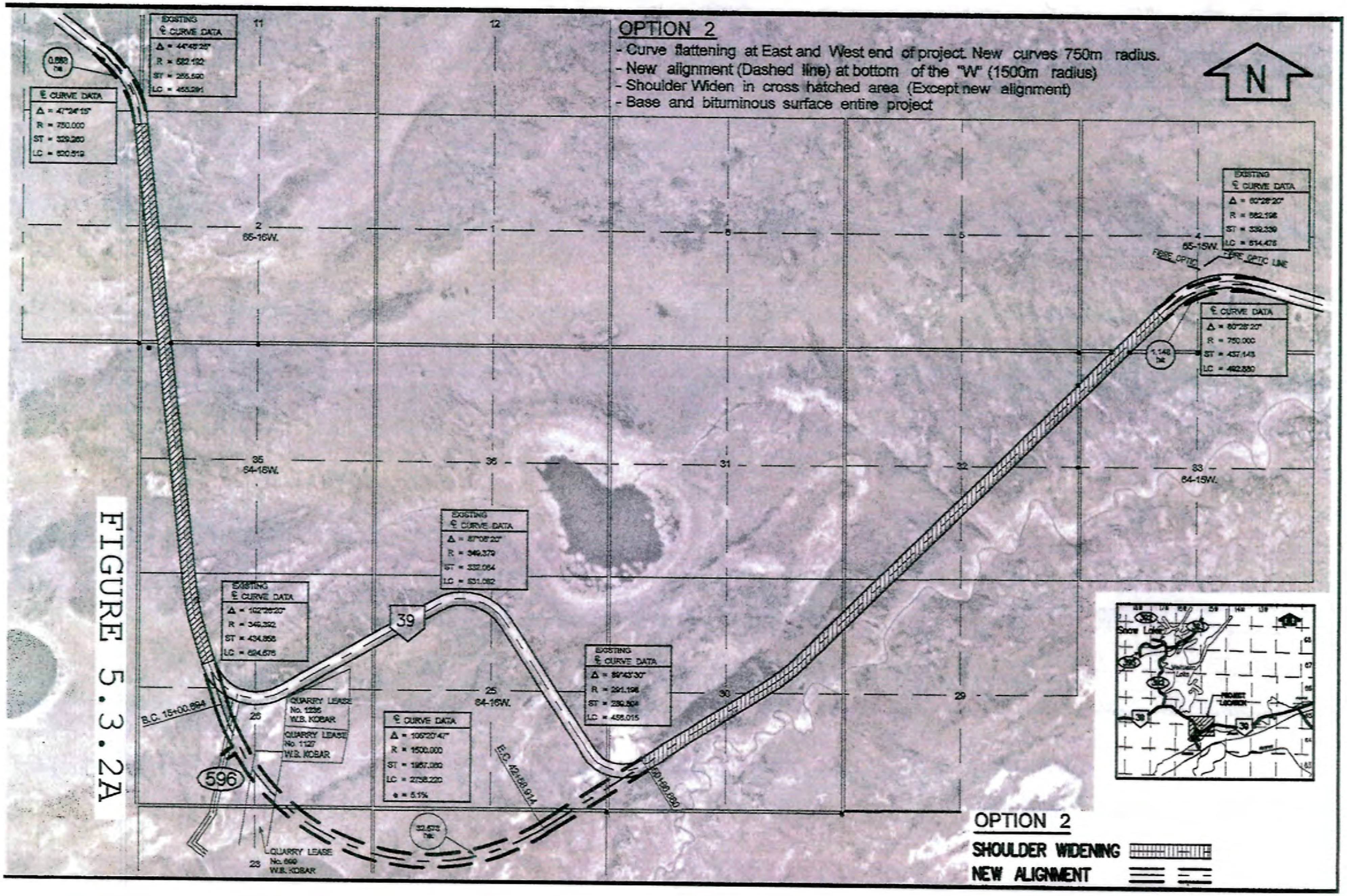
OPTION 2
- Curve flattening at East and West end of project. New curves 750m radius.
- New alignment (Dashed line) at bottom of the "W" (1500m radius)
- Shoulder Widen in cross hatched area (Except new alignment)
- Base and bituminous surface entire project
N
EXISTING ℄ CURVE DATA
℄ CURVE DATA
65-16W.
64-16W.
65-15W.
64-15W.
FIBRE OPTIC LINE
39
596
QUARRY LEASE
W.B. KOBAR
Snow Lake
OPTION 2
SHOULDER WIDENING
NEW ALIGNMENT

FIGURE 5.3.2A

5.3.3 OPTION THREE

- Re-align PTH 39 across the top of the "W" configuration.
- Construct the new roadway from local borrow and place bituminous surface.
- This would result in 8.6 km of new construction.
- The finished surface would feature two 3.7 m paved lanes with a partially paved (0.8 m) shoulder, 2.5 m wide, with 4:1 grade slopes.
- This would shorten the route from 16 km to 8.6 km.
- This Option would require 70.00 ha of new right of way.
- Cost estimate is $ 5,092,117.

(See Figure 5.3.3 A)

5.3.4 OPTION FOUR

- Alignment involves flattening curves at east and west limits of project to 800 m radius.
- Changing configuration of existing alignment from a "W" to a flat bottom "U" shape.
- The curves at the bottom of the "U" would also 800 m radius.
- The finished surface would feature two 3.7 m paved lanes with a partially paved (0.8 m) shoulder, 2.5 m wide, with 4:1 grade slopes.
- The new alignment avoids the marble lease at the bottom of the "W".
- A new intersection at PR 596 would have to be constructed.
- This option would require 33.70 ha of new right of way.
- Cost estimate is $ 7,167,934.

(See Figure 5.3.4 A)

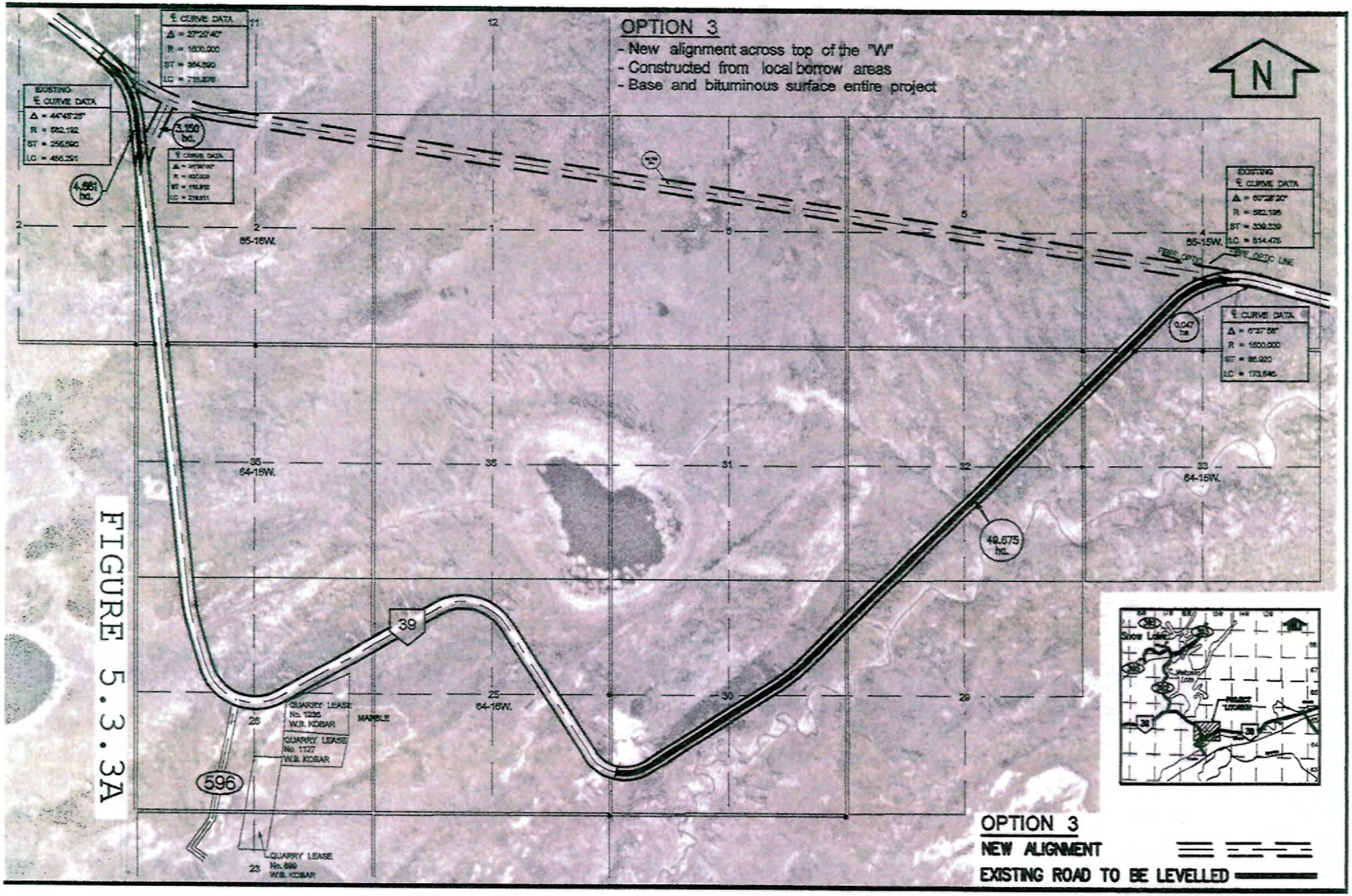
OPTION 3
- New alignment across top of the "W"
- Constructed from local borrow areas
- Base and bituminous surface entire project
N
EXISTING ℄ CURVE DATA
Δ = 44°48'25"
R = 582.192
ST = 256.590
LC = 456.291
℄ CURVE DATA
Δ = 27°22'40"
R = 1600.000
ST = 384.590
LC = 715.876
3.150 ha.
4.661 ha.
EXISTING ℄ CURVE DATA
Δ = 60°28'20"
R = 582.196
ST = 339.239
LC = 614.475
9.047 ha.
℄ CURVE DATA
Δ = 6°37'56"
R = 1600.000
ST = 86.920
LC = 173.646
49.675 ha.
FIBRE OPTIC LINE
65-15W.
64-15W.
39
596
QUARRY LEASE No. 1235 W.B. KOBAR
MARBLE
QUARRY LEASE No. 1127 W.B. KOBAR
QUARRY LEASE No. 699 W.B. KOBAR
OPTION 3
NEW ALIGNMENT
EXISTING ROAD TO BE LEVELLED

FIGURE 5.3.3A

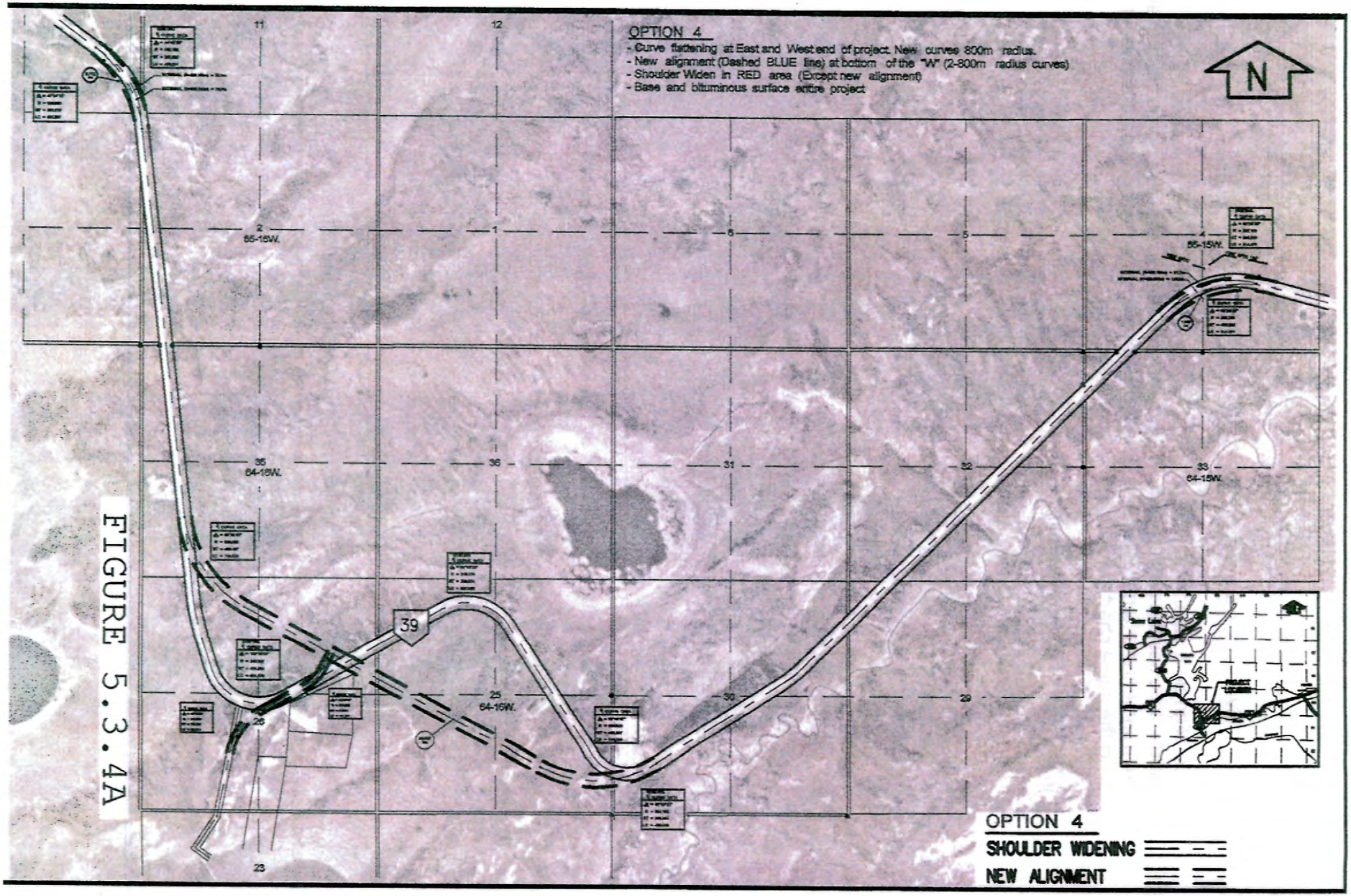
OPTION 4
- Curve flattening at East and West end of project. New curves 800m radius.
- New alignment (Dashed BLUE line) at bottom of the "W" (2-800m radius curves)
- Shoulder Widen in RED area (Except new alignment)
- Base and bituminous surface entire project
N
11
12
2
65-16W.
1
6
5
4
65-15W.
35
64-16W.
36
31
32
33
64-15W.
39
25
64-16W.
30
29
26
23
OPTION 4
SHOULDER WIDENING
NEW ALIGNMENT

FIGURE 5.3.4A

6.1 EVALUATION METHODOLOGY

The alignment alternatives were compared by the "weighted bubblechart method", which classifies the analysis into three categories, engineering, socio-economic, and environmental criteria. This method shows the alternatives weighted against each other all in the same chart for comparison and evaluation purposes.

6.1.1 ENGINEERING CRITERIA

The engineering was evaluated by rating the following criteria:

- Lowest construction costs.
- New (R.O.W.) land to be acquired.
- Lowest maintenance cost.
- Maximizes safety (motorists).
- Meets geometric design standards.
- Improves traffic efficiency (less curves).
- Compatible with proposed future highway facilities.
- Best construction staging potential.
- Reduces PTH length (14.5 km).
- Better truck/ hazardous goods route.

6.1.2 SOCIO-ECONOMIC CRITERIA

The socio-economic was evaluated by rating the following criteria:

- Provides better access to communities.
- Safest for motoring public.
- Provides access for stakeholders.
- Shortest route (gas savings).

6.1.3 ENVIRONMENTAL CRITERIA

The environmental was evaluated by rating the following criteria:

- Minimizes loss of wildlife habitat.
- Minimizes impact on natural watercourses.
- Potential to disrupt drainage patterns.
- Minimizes borrow requirements (vol./land area).

For the purpose of this study, the alternatives were analyzed by an onsite investigation and reviewing soil and land surveys. The analysis also took into consideration the constraints of the study area the needs of today's geometric standards.

6.2.1 OPTION ONE AND OPTION TWO

These Options were explored simultaneously because they follow the same "U" shaped alignment. The alignment was surveyed conventionally by Region Five staff; however a soil survey was not conducted. The area was observed to have a very rocky and swampy terrain. Based on existing conditions, a separate cost estimate for each option was derived.

(See Figure 6.2.1 A and 6.2.1 B)

6.2.2 OPTION THREE

Option Three was partly analyzed by engineering staff of Region Five. The Region Five staff had cleared a brush line for the alignment and completed a soil survey with a hydraulic excavator. They also established a vertical profile using total station survey technology through the proposed alignment. This data was used to derive a cost estimate for this proposed Option.

(See Figure 6.2.2 A)

6.2.3 OPTION FOUR

The analysis of Option Four was done with a site investigation and the use of GPS Technology. A soil survey was conducted locating the existing make up of the earth's structure. To establish the existing vertical profile of the land, a combination of GPS data collection and conventional survey was used. Region One staff developed a design gradeline for the new location together with the quantities through an IGRDS run. This data was used to derive a cost estimate for this proposed Option.

(See Figure 6.2.3 A)

6.3 EVALUATION OF ALIGNMENT ALTERNATIVES

Once the analysis of the alignment alternatives for the study area was complete, Region One staff was able to develop a "weighted-mean bubblechart" comparing the four alternatives.

(See Figure 6.3 A)

MANITOBA
TRANSPORTATION & GOVERNMENT SERVICES

ESTIMATE/COST SHEET

REGION NO FIVE
APPROP
R.M. OF

ROUTE N PTH 39
CMS NO 1494-1 LOCATION **OPTION "1"**
DATE Nov-02 NEW ALIGNMENT WITH BITUMINOUS SURFACE

LENGTH GRADE WIDEN 9.85 km
LENGTH NEW GRADE 3.9 km

ITEM CODE	ITEMS	UNITS	QUANTITY	RATE $	AMOUNT
100	MOBLIZATION OF EQUIPMENT	L.S.			100,000.00
104	TRAFFIC CONTROL LEVEL IV	L.S.			50,000.00
307M	SURFACE PREPARATION TYPE "B" (Modified)	sta.	99	350.00	34,475.00
650	CRUSHED ROCK 125mm	t	110,000	5.00	550,000.00
315	BINDER MATERIAL	t	7,500	1.00	7,500.00
310	GRANULAR BASE COURSE "A"	t	85,000	7.50	637,500.00
170	SOLID ROCK EXCAVATION	m^3	130,000	13.00	1,690,000.00
122	CLEARING AND GRUBBING	ha	33	1,200.00	39,600.00
168	COMPOSITE EXCAVATION	m3	15,000	2.50	37,500.00
172	WASTE(coring & cored) EXCAVATION	m^3	78,000	2.50	195,000.00
316	PRIME COAT	l	117,000	0.25	29,250.00
322	BITUMINOUS PAVEMENT CLASS "B"	t	15,000	20.00	300,000.00
323	BITUMINOUS PAVEMENT CLASS "C"	t	15,000	20.00	300,000.00
502	EXCAVATOR	ha	40	100.00	4,000.00
299	TEMPORARY OVERLAY MARKERS	each	900	3.50	3,150.00
107	EXTRA WORK	L.S.			20,000.00
	VMA HAUL				20,000.00
	RIDING BONUS & 50%	l/km	13.75	590.00	8,112.50
	CONTRACT ITEMS SUB-TOTAL				**4,026,087.50**
	NON-CONTRACT PURCHASE ITEMS				
282	BITUMINOUS PAVEMENT ASPHALTS	t	1,784	325.00	579,800.00
283	PRIME ASPHALTS	t	117	325.00	38,025.00
285	TACK COAT ASPHALTS	t	74	325.00	24,050.00
006	EROSION CONTROL (RIP-RAP & SEEDING)	L.S.			8,800.00
008	DUST ABATEMENT	L.S.			
014	GRADE PREPARATION (LIME & GEOTEXTILES)	L.S.			
	NON-CONTRACT SUB-ACTIVITIES				
020	HAUL ROADS	L.S.			10,000.00
370	MATERIAL AND RESEARCH TESTING	L.S.			12,000.00
371	QUALITY ASSURANCE	L.S.			40,000.00
372	PROFILOMETER	km	14	1,200.00	16,500.00
961	CONSTRUCTION TRAFFIC CONTROL	L.S.			10,000.00
963	PERMANENT SIGNING	L.S.			10,000.00
965	PAVEMENT MARKING (does not include travel time)	km	14	900.00	12,375.00
968	ILLUMINATION	L.S.			5,000.00
170	AGGREGATE SALES TAX & 2.1%	$	1,795,000	0.021	37,695.00
260	ENGINEERING EQUIPMENT AND SUPPLIES	L.S.			10,000.00
364	TRAINING AND MEETINGS	L.S.			10,000.00
	NON- CONTRACT ITEMS SUB TOTAL				**824,245.00**
	CONTRACT SUB-TOTAL				**4,850,332.50**
361	**ENGINEERING @ %**	L.S.	4,026,088	0.20	**805,217.50**
				TOTAL	**5,655,550.00**

AVERAGE COST PER KM:
SUBMITTED BY:
APPROVED:
COMMENT NOTE:
New Land to Aquire = 32.57 ha
Non-contract sub-activities were calculated for two contracts, subgrade then surfacing.

FIGURE 6.2.1 A

MANITOBA
TRANSPORTATION & GOVERNMENT SERVICES

ESTIMATE/COST SHEET

REGION NO: FIVE
APPROP:
R.M. OF:

ROUTE N: PTH 39
CMS NO: 1494-1
LOCATION: **OPTION "2"**
DATE: Nov-02
NEW ALIGNMENT WITH CURVE SOFTENING AND BITUMINOUS

LENGTH - GRADE WIDEN: 8.87 km
LENGTH - NEW GRADE: 4.97 km

ITEM CODE	ITEMS	UNITS	QUANTITY	RATE $	AMOUNT
100	MOBLIZATION OF EQUIPMENT	L.S.			100,000.00
104	TRAFFIC CONTROL LEVEL IV	L.S.			50,000.00
307M	SURFACE PREPARATION TYPE "B" (Modified)	sta.	88	350.00	30,800.00
310	GRANULAR BASE COURSE "A"	t	85,000	7.50	637,500.00
315	BINDER MATERIAL	t	7,500	1.00	7,500.00
650	CRUSHED ROCK 125mm	t	120,000	5.00	600,000.00
170	SOLID ROCK EXCAVATION	m^3	130,000	13.00	1,690,000.00
168	COMPOSIT EXCAVATION	m^3	15,000	2.50	37,500.00
122	CLEARING AND GRUBBING	ha	33	1,200.00	39,600.00
172	WASTE(coring & cored) EXCAVATION	m^3	75,000	2.50	187,500.00
316	PRIME COAT	l	117,000	0.25	29,250.00
322	BITUMINOUS PAVEMENT CLASS "B"	t	15,000	20.00	300,000.00
323	BITUMINOUS PAVEMENT CLASS "C"	t	15,000	20.00	300,000.00
502	EXCAVATOR	h	40	100.00	4,000.00
299	TEMPORARY OVERLAY MARKERS	each	900	3.50	3,150.00
107	EXTRA WORK	L.S.			20,000.00
	VMA HAUL				20,000.00
	RIDING BONUS & 50%	l/km	13.84	590.00	8,165.60
	CONTRACT ITEMS SUB-TOTAL				**4,064,965.60**
	NON-CONTRACT PURCHASE ITEMS				
282	BITUMINOUS PAVEMENT ASPHALTS	t	1,784	325.00	579,800.00
283	PRIME ASPHALTS	t	117	325.00	38,025.00
285	TACK COAT ASPHALTS	t	74	325.00	24,050.00
006	EROSION CONTROL (RIP-RAP & SEEDING)	L.S.			8,880.00
008	DUST ABATEMENT	L.S.			
014	GRADE PREPARATION (LIME & GEOTEXTILES)	L.S.			
	NON-CONTRACT SUB-ACTIVITIES				
020	HAUL ROADS	L.S.			10,000.00
370	MATERIAL AND RESEARCH TESTING	L.S.			12,000.00
371	QUALITY ASSURANCE	L.S.			40,000.00
372	PROFILOMETER	km	13.84	1,200.00	16,608.00
961	CONSTRUCTION TRAFFIC CONTROL	L.S.			10,000.00
963	PERMANENT SIGNING	L.S.			10,000.00
965	PAVEMENT MARKING (does not include travel time)	km	13.84	900.00	12,456.00
968	ILLUMINATION	L.S.			5,000.00
170	AGGREGATE SALES TAX & 2.1%	$	1,845,000	0.021	38,745.00
260	ENGINEERING EQUIPMENT AND SUPPLIES	L.S.			10,000.00
364	TRAINING AND MEETINGS	L.S.			10,000.00
	NON- CONTRACT ITEMS SUB TOTAL				**825,564.00**
	CONTRACT SUB-TOTAL				**4,890,529.60**
361	**ENGINEERING @ %**	L.S.	4,064,966	0.20	**812,993.12**
				TOTAL	**5,703,522.72**

AVERAGE COST PER KM:
SUBMITTED BY:
APPROVED:
COMMENT NOTE:

New land to aquire = 34.7 ha
Non-contract sub-activities were calculated for two contracts, subgrade then surfacing.

FIGURE 6.2.1 B

MANITOBA
TRANSPORTATION & GOVERNMENT SERVICES

ESTIMATE/COST SHEET

REGION NO FIVE
APPROP
R.M. OF

ROUTE N PTH 39
CMS NO 1494-1 LOCATION **OPTION "3"**
DATE 20-Sep NEW ALIGNMENT WITH BITUMINOUS SURFACE

LENGTH NEW ROADWAY 8.6 kms

ITEM CODE	ITEMS	UNITS	QUANTITY	RATE $	AMOUNT
100	MOBLIZATION OF EQUIPMENT	L.S.			100,000.00
103	TRAFFIC CONTROL LEVEL III	L.S.			50,000.00
310	GRANULAR BASE COURSE "A"	t	55,000	7.50	412,500.00
315	BINDER MATERIAL	t	5,500	1.00	5,500.00
650	CRUSHED ROCK 125 mm	t	110,000	5.00	550,000.00
168	COMPOSITE EXCAVATION @ 20% Shrinkage	m^3	500,000	2.50	1,250,000.00
122	CLEARING AND GRUBBING	ha	73	1,200.00	87,780.00
172	WASTE EXCAVATION (coring and ditchs)	m^3	298,639	2.50	746,597.50
906	LEVELLING ROADWAY	sta.	54	800.00	43,456.00
316	PRIME COAT	l	73,000	0.25	18,250.00
322	BITUMINOUS PAVEMENT CLASS "B"	t	10,000	20.00	200,000.00
323	BITUMINOUS PAVEMENT CLASS "C"	t	10,000	20.00	200,000.00
502	EXCAVATOR	h	40	100.00	4,000.00
299	TEMPORARY OVERLAY MARKERS	each	500	3.50	1,750.00
107	EXTRA WORK	L.S.			20,000.00
	VMA HAUL				20,000.00
	RIDING BONUS & 50%	l/km	9	590.00	5,074.00
	CONTRACT ITEMS SUB-TOTAL				**3,714,907.50**
	NON-CONTRACT PURCHASE ITEMS				
282	BITUMINOUS PAVEMENT ASPHALTS	t	1,200	360.00	432,000.00
283	PRIME ASPHALTS	t	73	360.00	26,280.00
285	TACK COAT ASPHALTS	t	46	360.00	16,560.00
006	EROSION CONTROL (RIP-RAP & SEEDING)	L.S.			5,600.00
008	DUST ABATEMENT	L.S.			
014	GRADE PREPARATION (LIME & GEOTEXTILES)	L.S.			
	NON-CONTRACT SUB-ACTIVITIES				
020	HAUL ROADS	L.S.			10,000.00
370	MATERIAL AND RESEARCH TESTING	L.S.			12,000.00
371	QUALITY ASSURANCE	L.S.			40,000.00
372	PROFILOMETER	km	9	1,200.00	10,320.00
961	CONSTRUCTION TRAFFIC CONTROL	L.S.			10,000.00
963	PERMANENT SIGNING	L.S.			10,000.00
965	PAVEMENT MARKING (does not include travel time)	km	9	900.00	7,740.00
968	ILLUMINATION	L.S.			5,000.00
170	AGGREGATE SALES TAX & 2.1%	$	1,368,000	0.021	28,728.00
260	ENGINEERING EQUIPMENT AND SUPPLIES	L.S.			10,000.00
364	TRAINING AND MEETINGS	L.S.			10,000.00
	NON- CONTRACT ITEMS SUB TOTAL				**634,228.00**
	CONTRACT SUB-TOTAL				**4,349,135.50**
361	**ENGINEERING @ %**	L.S.	3,714,908	0.20	**742,981.50**
				TOTAL	**5,092,117.00**

AVERAGE COST PER KM:
SUBMITTED BY: APPROVED:
COMMENT NOTE:

NEW LAND TO AQUIRE = 70.0 ha
SURCHARGE OF 0.3m WOULD REQUIRE ANOTHER 50,000M3 OF COMPOSITE MATERIAL
New intersection at west end of project would cost $80,000.00

FIGURE 6.2.2 A

MANITOBA
TRANSPORTATION & GOVERNMENT SERVICES

ESTIMATE/COST SHEET

REGION NO FIVE
APPROP
R.M. OF

ROUTE NO PTH 39
CMS NO 1494-1
DATE SEPT 2002

LOCATION **OPTION "4"(G.P.S) INFO**
NEW ALIGNMENT WITH BITUMINOUS SURFACE

LENGTH - GRADE WIDEN 7.44
LENGTH - NEW GRADE 5.40

ITEM CODE	ITEMS	UNITS	QUANTITY	RATE $	AMOUNT
100	MOBLIZATION OF EQUIPMENT	L.S.			100,000.00
104	TRAFFIC CONTROL LEVEL IV	L.S.			50,000.00
307M	SURFACE PREPARATION TYPE "B" (Modified)	sta.	74	350.00	26,043.50
310	GRANULAR BASE COURSE "A"	t	84,000	7.50	630,000.00
315	BINDER MATERIAL	t	8,400	1.00	8,400.00
650	CRUSHED ROCK 125mm	t	147,000	5.00	735,000.00
168	COMPOSIT EXCAVATION EMBANKMENT MAT'L	m^3	50,000	2.50	125,000.00
170	SOLID ROCK EXCAVATION	m^3	195,000	13.00	2,535,000.00
122	CLEARING AND GRUBBING	ha	33	1,200.00	40,184.40
172	WASTE EXCAVATION	m^3	54,600	2.50	136,500.00
906	LEVELLING ROADWAY	sta.	42	800.00	33,708.00
316	PRIME COAT	l	116,000	0.25	29,000.00
322	BITUMINOUS PAVEMENT CLASS "B"	t	15,000	20.00	300,000.00
323	BITUMINOUS PAVEMENT CLASS "C"	t	15,000	20.00	300,000.00
502	EXCAVATOR	h	40	100.00	4,000.00
299	TEMPORARY OVERLAY MARKERS	each	800	3.50	2,800.00
130	REMOVING METAL PIPE CULVERTS	m	219	50.00	10,950.00
135	PLACING CULVERTS GROUP "A"	m	104	35.00	3,640.00
136	PLACING CULVERTS GROUP "B"	m	185	70.00	12,950.00
137	PLACING CULVERTS GROUP "C"	m	48	125.00	6,000.00
107	EXTRA WORK	L.S.			40,000.00
	VMA(HAUL)				30,000.00
	RIDING BONUS 100%	l/km	13	590.00	7,575.60
	CONTRACT ITEMS SUB-TOTAL				**5,166,751.50**
	NON-CONTRACT PURCHASE ITEMS				
282	BITUMINOUS PAVEMENT ASPHALTS	t	1,784	360.00	642,240.00
283	PRIME ASPHALTS	t	117	360.00	42,120.00
285	TACK COAT ASPHALTS	t	74	360.00	26,640.00
006	EROSION CONTROL (RIP-RAP & SEEDING)	L.S.			8,240.00
008	DUST ABATEMENT	L.S.			
270	DRAINAGE DEVICES	L.S.			77,266.04
	NON-CONTRACT SUB-ACTIVITIES				
020	HAUL ROADS	L.S.			10,000.00
370	MATERIAL AND RESEARCH TESTING	L.S.			12,000.00
371	QUALITY ASSURANCE	L.S.			40,000.00
372	PROFILOMETER	km	13	1,200.00	15,464.40
961	CONSTRUCTION TRAFFIC CONTROL	L.S.			10,000.00
963	PERMANENT SIGNING	L.S.			5,000.00
965	PAVEMENT MARKING (does not include travel time)	km	14	900.00	12,420.00
968	ILLUMINATION	L.S.			5,000.00
170	AGGREGATE SALES TAX & 2.1%	$	1,973,400	0.021	41,441.40
260	ENGINEERING EQUIPMENT AND SUPPLIES	L.S.			10,000.00
364	TRAINING AND MEETINGS	L.S.			10,000.00
	NON- CONTRACT ITEMS SUB TOTAL				**967,831.84**
	CONTRACT SUB-TOTAL				**6,134,583.34**
361	**ENGINEERING @ %**	L.S.	5,166,752	0.20	**1,033,350.30**
				TOTAL	**7,167,933.64**

AVERAGE COST PER KM:
SUBMITTED BY: Dave L.
APPROVED:
COMMENT NOTE: NEW LAND TO AQUIRE = 33.7 ha

New Access to P.R. 596 = 0.62 Km of new roadway will be constructed for a new intersection at PR 596
$117,200 x 0.62 = $72,664 SAY $73,000 for new intersection
note : $117,200 is an average for grade and gravel per Km for all five regions.

FIGURE 6.2.3 A

P.T.H. 39 RE-ALIGNMENT (Wekusko)

	ENGINEERING CRITERIA	RATING FACTOR	ALT."1"	RATING VALUE	ALT."2"	RATING VALUE	ALT."3"	RATING VALUE	ALT."4" G.P.S.	RATING VALUE
1	LOWEST CONSTRUCTION COSTS	15	● $ 5.66 mil	15	● $ 5.70 mil	15	●●● $ 5.09 mil	45	● $ 7.16 mil	15
2	NEW (R.O.W.) LAND TO BE AQUIRED	10	●●● 32.75 ha	30	●●● 34.7 ha	30	● 73 ha	10	●●● 33.7 ha	30
3	LOWEST MAINTENANCE COST	5	●	5	●	5	●●●	15	●	5
4	MAXIMIZES SAFTEY (MOTORIST)	5	●	5	●	5	●●●	15	●	5
5	MEETS GEOMETRIC DESIGN STANDARDS	5	●	5	●●	10	●●●	15	●●	10
6	IMPROVES TRAFFIC EFFICIENCY (LESS CURVES)	5	●	5	●	5	●●●	15	●●	10
7	BEST CONSTRUCTION STAGING POTENTIAL	5	●	5	●	5	●●●	15	●	5
8	COMPATIBLE WITH PROPOSED FUTURE HIGHWAY FACILITIES	2	●●	4	●●	4	●●●	6	●●	4
9	REDUCES P.T.H. LENGTH (14.5 km)	3	● 13.75 km	3	● 13.75 km	3	●●● 8.6 km	9	● 12.9 km	3
10	BETTER TRUCK ROUTE / HAZARDOUS GOODS	2	●	2	●	2	●●●	6	●●	4
	OVERALL RATING	57%		79		84		151		91

	SOCIO-ECONOMIC CRITERIA	RATING FACTOR	ALT."1"	RATING VALUE	ALT."2"	RATING VALUE	ALT."3"	RATING VALUE	ALT."4"	RATING VALUE
1	PROVIDES BETTER ACCESS TO COMMUNITIES	10	●●	20	●●	20	●●	20	●	10
2	SAFEST FOR MOTORING PUBLIC	5	●	5	●	5	●●●	15	●	5
3	PROVIDES ACCESS FOR STAKEHOLDERS (HUDSON BAY RAILROAD & MANITOBA MARBLE)	2	●●●	6	●●●	6	●	2	●●	4
4	SHORTEST ROUTE (GAS SAVINGS)	4	● 13.75km	4	● 13.75km	4	●●● 8.6 km	12	● 12.9 km	4
	OVERALL RATING	21%		35		35		49		23

	ENVIRONMENTAL CRITERIA	RATING FACTOR	ALT."1"	RATING VALUE	ALT."2"	RATING VALUE	ALT."3"	RATING VALUE	ALT."4"	RATING VALUE
1	MINIMIZES LOSS OF WILDLIFE HABITAT	6	●● 32.75ha	12	●● 34.7ha	12	● 73 ha	6	● 32 ha	6
2	MINIMIZES IMPACT ON NATURAL WATER COURSES	6	●●	12	●●	12	●●	12	●●	12
3	POTENTIAL TO DISRUPT DRAINAGE PATTERNS	5	●●	10	●●	10	●●●	15	●●	10
4	MINIMIZES BORROW REQUIREMENTS (VOL/LAND AREA)	5	●●	10	●●	10	●	5	●●	10
	OVERALL RATING	22%		44		44		38		38

OVERALL EVALUATION	RATING FACTOR	ALTERNATIVE "1" RATING VALUE	ALTERNATIVE "2" RATING VALUE	ALTERNATIVE "3" RATING VALUE	ALTERNATIVE "4" RATING VALUE
ENGINEERING CRITERIA	57%	79	84	151	91
SOCIO-ECONOMIC CRITERIA	21%	35	35	49	23
ENVIRONMENTAL CRITERIA	22%	44	44	38	38
TOTAL OVERALL RATING	100%	158	163	238	152

LEGEND: ●●● GOOD ●● MEDIUM ● POOR N/A = NOT APPLICABLE

FIGURE 6.3 A

The junction of PR 596/PTH 39 will have to be re-designed once a preferred alternative for PTH 39 is chosen. Alternatively, one option is to abandon PR 596 altogether, turning it over to local stakeholders that may require use of the roadway.

6.5 SELECTION OF THE RECOMMENDED ALTERNATIVE

The recommended alternative for the study area is Option Three. This alternative was chosen because of its evaluation through the bubblechart technique, which pointed out its lower cost and safety benefits for motorists. Also the alignment reduces maintenance costs due to its reduction in length.

7.1 GENERAL

7.1.1 QUANTITIES AND ESTIMATES

The quantities and estimates for the recommended functional design (option three) were calculated using a structure of:

- 400 mm of 125 mm Rock
- 150 mm of Granular Base Course Class 'A'
- 50 mm of Bituminous Class 'C'
- 50 mm of Bituminous Class 'B'

The total quantities calculated area as follows:

- 110 000 t of 125 mm Rock
- 55 000 t of Granular Base Course Class 'A'
- 10 000 t of Bituminous Class 'C'
- 10 000 t of Bituminous Class 'B'

(See Figure 7.1.1 A)

7.1.2 PAVEMENT DESIGN STRUCTURE

The pavement design structure selected for the chosen alignment was designed by the Pavement Design Engineer and submitted by the Departments Senior Pavement and Geotechnical Engineer on February 25, 2002. The design was assessed accordingly to the study area's current and projected AADT (with a constant 14% truck traffic) and a design loading class of RTAC standards.

(See Figure 7.1.2 A)

7.1.3 ENVIRONMENTAL CONCERNS

The environmental concerns for the study area are to be reviewed within the Environmental Pre-screening Document. This document has been prepared for the study area and can be found attached ready for submittal.

7.2 PTH 39 OPTION 3

7.2.1 EXISTING PTH 39

Under the preferred option, portions of PTH 39 will be available for abandonment. They include a proposed revestment at the eastern limits of roadway (from southeast quarry pit going northerly) and a proposed revestment at the northwest limit of the roadway (where a new intersection will be constructed, requiring some old roadway to be removed).

HWY NO. pth 39 **REG.** 5 **PROJECT NO.** 1494-1

LOCATION 1.0km west of PR 596 --- 4.0km East of pr 596 **DATE** Feb-02

DESIGN INFORMATION **OPTION "3" NEW ALIGNMENT**

Length	**8.6** km	Bituminous	**100** mm	GBC 'A'	**150** m	Lane Width	**3.7** m
Slopes	**3** :1	No. of Lifts	**2**	125 ROCK	**400** mm	Shoulder Width	**2.5** m
				Shoulder Edge Treatment	**0.50** m	"A" =	**0.8** m

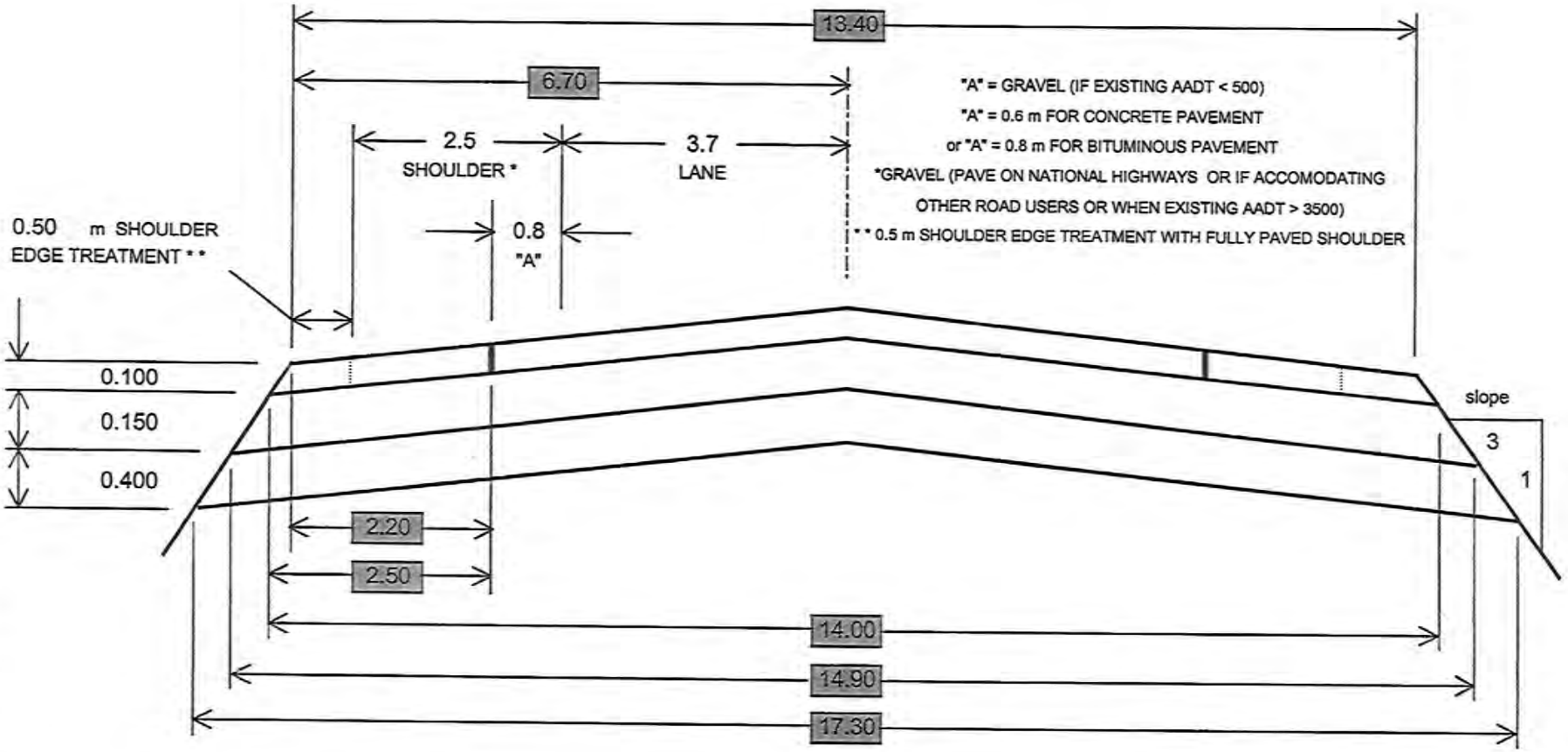

FIGURE 7.1.1 A

41,811	t	GBC 'A' @ 2.243 t/m^3	105,230	t	125 ROCK @ 1.90 t/m^3	46	t TACK @ 0.3 l/m^2
9,066	t	SHOULDERS	18,599	t	BITUMINOUS @ 2.403 t/m^3	73	t PRIME @ 0.6 l/m^2
50,877	t	GBC 'A' Total	1,116	t	ASPHALT CEMENT @ 6%	120	t SS-1 Total

Dept. of Highways

FEB 2 8 2002

Region 5 - Thompson

MANITOBA TRANSPORTATION AND GOVERNMENT SERVICES
Materials and Research Branch
PAVEMENT STRUCTURE AND SURFACE DESIGN MEMO

REGIONAL MATERIALS TECHNOLOGIST	[redacted]	DATE	Feb. 25,2002
PROJECT NUMBER	1494	Version No.	1
CONTROL SECTION	05 039 040/050	Previous Version Date	N.A.
FROM	6.0 Km West of PR 596		
TO	10.0 Km East of PR 596	Design Status	Preliminary
PROJECT TYPE	Provide design for new construction.		

Km 11.8-17.8 Km 0.0-10.0 LANES EXISTING LOADING CLASSIFICATION RTAC

The following Table lists the Construction and Rehabilitation Measures which are required to achieve Department Standards:

LOCATION or OPTION	PREPARATION or LEVELLING	STRUCTURE THICKNESS - mm			
		Base	Base A	Base Bit C	Surface Bit B
New location – option 1		400 mm - 125 mm minus limestone	150	50	50
- option 2		250mm - C base	150	50	50

DESIGN COMMENTS

Subgrade Design based upon an A-7-6(20) high plastic clay. Final soil survey required.

Cross Section

Traffic Annual ESALs = 13,000; 20 year ESALs = 317,000

ASSESSMENTS

TRAFFIC: AADT Current 170 (1999) **Projected** 275 (2023) 2 -Way

TRUCKS 14% **Design Loading Class** RTAC **Special**

Existing Surface New location.

Drainage

Distribution:
Director of Materials & Research (File #1)
Surfacing Engineer & Technologist
Geotechnical Eng. & Technologist
Sr. Highway Planning Engineer
Engineering Audit & Quality Assurance
Pavements File #2
Eufford - Steinbach

Designed by: S. Hildebrand
Pavement Design Engineer

Submitted by: [signature]
Senior Pavement & Geotechnical Engineer

W:\...wymat\Mat-main\10\lexbl\10-000\10-001.mem

FAX TO REGION: NO YES

FIGURE 7.1.2 A

7.2.1 DRAINAGE

The drainage design for the preferred Option consists of one proposed through-grade culvert at station 52+00. This culvert will require a detailed design to size the culvert for the flows that it will be required to handle. More detailed hydrological information may be required depending on the need for fish passage at the site.

7.3 PR 596

7.3.1 FUNCTIONAL PLAN

PR 596 has a few different Options, which would have to be addressed when a Detailed Design is finalized. The Options are abandoning the road altogether, review the Option of extending PR 596 onto the existing PTH 39 on the West side of the "W" and construct a new intersection to the proposed PTH 39. Another option is to have Hudson Bay Railroad to take over PR 596, since it runs south from PTH 39 to the Wekusko Siding.