West LRT Functional Study

VOLUME I
SUMMARY REPORT
CALTS SERIES 86-MARCH 83

THE CITY OF CALGARY
TRANSPORTATION DEPARTMENT

WEST LRT FUNCTIONAL STUDY

VOLUME I SUMMARY REPORT

CALTS SERIES 86 MARCH 1983

THE CITY OF CALGARY
TRANSPORTATION DEPARTMENT

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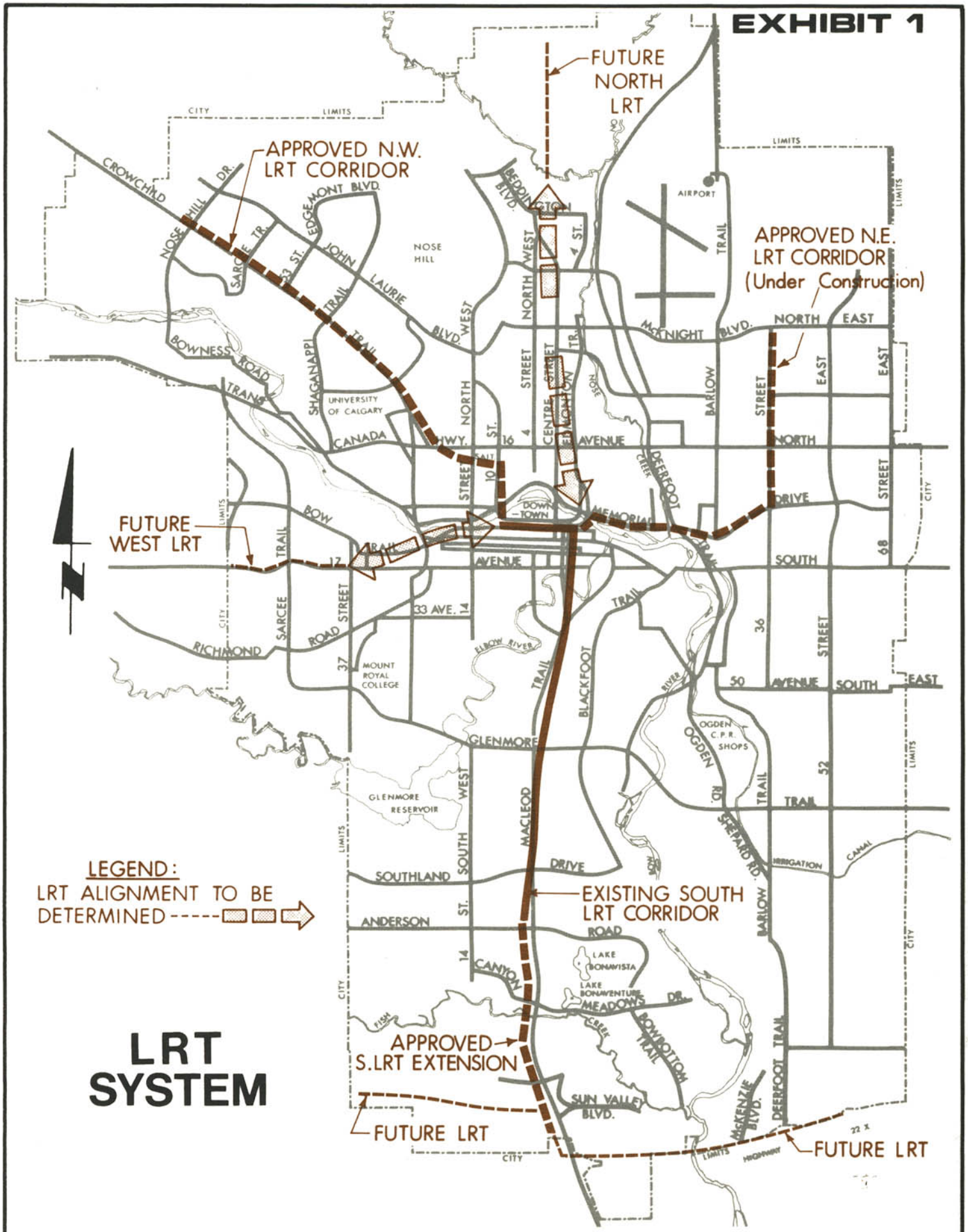
PREFACE

The West LRT Functional Study Report is divided into two volumes for convenience and ease of reference.

Volume 1 - Summary Report outlines the final recommendations of the functional study in a very small report, while briefly describing the scope of the study, operational characteristics of the LRT line, and cost implications.

Volume 2 - Technical Report is intended to be a comprehensive reference document and presents in detail the study history, organization, process, LRT alternatives, evaluation, conclusions, recommendations, operational characteristics and cost implications. This report has been organized in such a way that information on particular aspects of the study can easily be referred to.

EXHIBIT 1



LRT SYSTEM

WEST LRT FUNCTIONAL STUDY

1.0 INTRODUCTION

1.1 Background to the Study

On 1979 June 26 at a special meeting of City Council regarding the Southwest Roads Study, the following motion was adopted:

> "That the Transportation Department be instructed to undertake a comprehensive review of the West LRT line as soon as this can be scheduled into their work program."

The Transportation Department subsequently carried out the West LRT Functional Study, and the results of the study are documented in two volumes: Volume 1 - Summary Report, and Volume 2 - Technical Report.

1.2 LRT System Overview

The West LRT line will form part of a radial LRT system focusing on the Central Business District (CBD). This future network, portions of which are now operational or under construction, is illustrated in Exhibit 1.

The development of this network is in accordance with the **Calgary General Municipal Plan (1977)** which recognizes the importance of the role of public transit and the need for integration of land use and transportation. The need for an integrated transportation system is reflected in Council-approved overall transportation goals and objectives requiring LRT to be carefully coordinated with the construction and operation of other transportation facilities. Co-ordination is essential to ensure satisfactory levels of service are provided for the movement of automobiles, buses, goods and services, cyclists and pedestrians. The South leg of the network introduced LRT service in Calgary and began operation 1981 May 25. The Northeast LRT is the second line in the network and is described in the **Northeast LRT Functional Study** (CALTS 74) which received construction approval by City Council in 1981 July. The route for the Northwest LRT line is described in the **Northwest LRT Functional Study** (CALTS 73) which was substantially approved by Calgary's City Council in 1980 July. Revisions to this route proposal were approved by Council in 1982 January. City Council

approved the route for the South LRT Extension as described in the **South LRT Extension Functional Study** (CALTS 80) in 1982 June.

The West LRT, the subject of this report, conforms with the Calgary General Plan, with the City's overall transportation policy, and with the LRT system concept embodied in the previous planning for the South, Northwest, and Northeast legs. This concept, which has been applied to the West LRT, involves the predominant use of at-grade, semi-exclusive LRT rights-of-way with the flexibility to be separated from conflicting traffic movements either by traffic signals or grade separations, depending upon local conditions. This flexibility will permit the LRT to provide fast and dependable service to transit patrons at a substantially lower capital cost than a totally grade-separated system.

1.3 Scope of Study

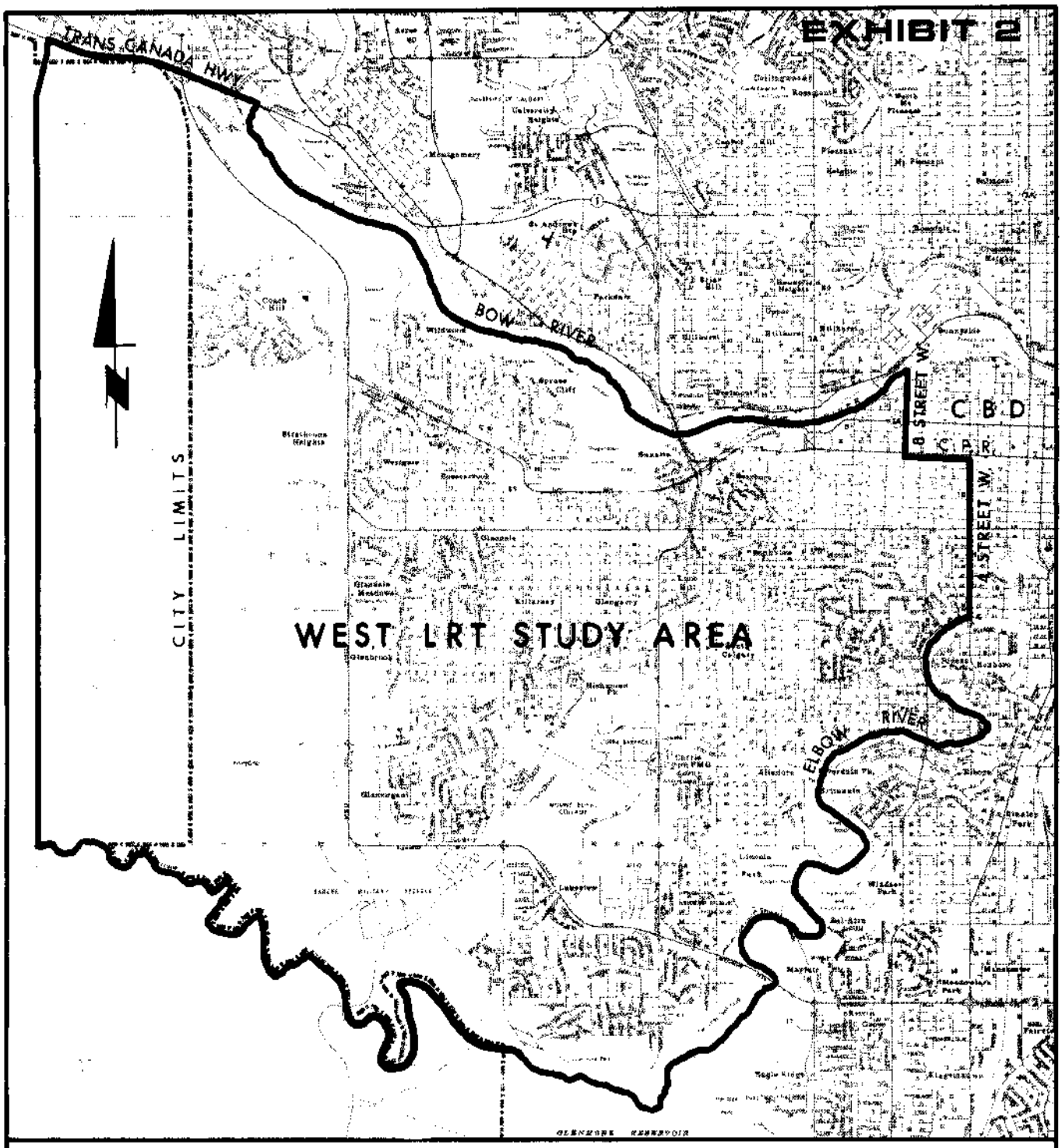
The boundaries of the West LRT Study Area are illustrated in Exhibit 2. They can be described as generally being bounded by the Bow River and Trans Canada Highway to the north, the Elbow River and Glenmore Reservoir to the south, 1.6 km west of the City limits to the west, and 8 Street W., the CP Rail tracks, and 4 Street W. to the east.

The primary purpose of the West LRT Functional Study is to determine the route for the West LRT, in order that the required right-of-way can be protected and that land use policies can be formulated to ensure that existing and future land uses will be compatible with the future development of LRT.

The specific objectives of the Study are as follows:

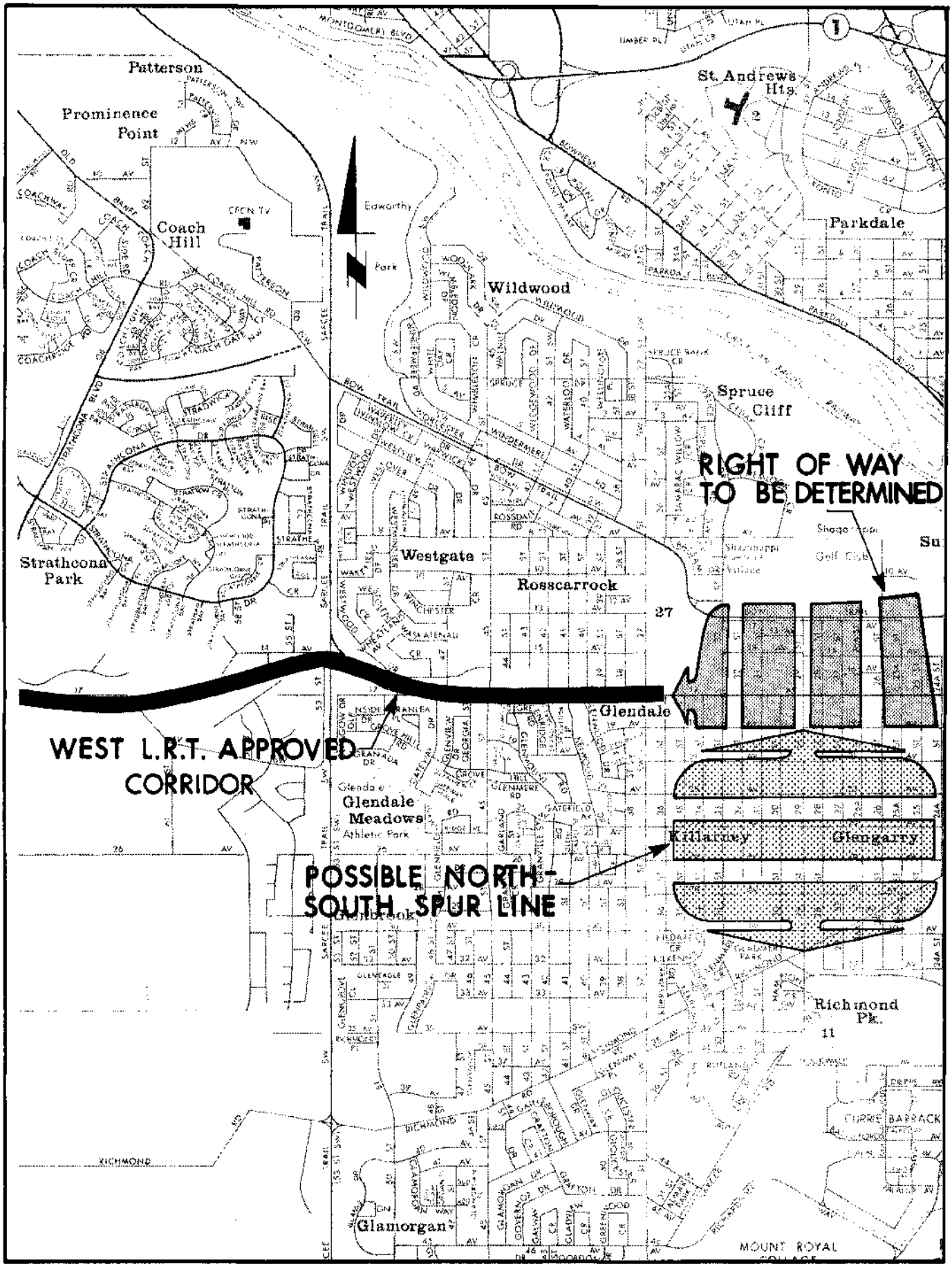
1. Determine the optimal LRT alignment and profile, between Downtown Calgary and the West limits of the City, taking into account community impacts, land use implications, operating characteristics, effects on the transportation system, and costs (Exhibit 3).

2. Locate and produce conceptual designs for the LRT stations.



WEST LRT STUDY AREA

WEST LRT FUNCTIONAL STUDY


Patterson
Prominence Point
Coach Hill
St. Andrews Hts.
Parkdale
Wildwood
Spruce Cliff
Strathcona Park
Westgate
Rosscarrock
Glendale
Glendale Meadows
Athletic Park
Killarney
Glengarry
Richmond Pk.
Glamorgan
RIGHT OF WAY TO BE DETERMINED
WEST L.R.T. APPROVED CORRIDOR
POSSIBLE NORTH-SOUTH SPUR LINE

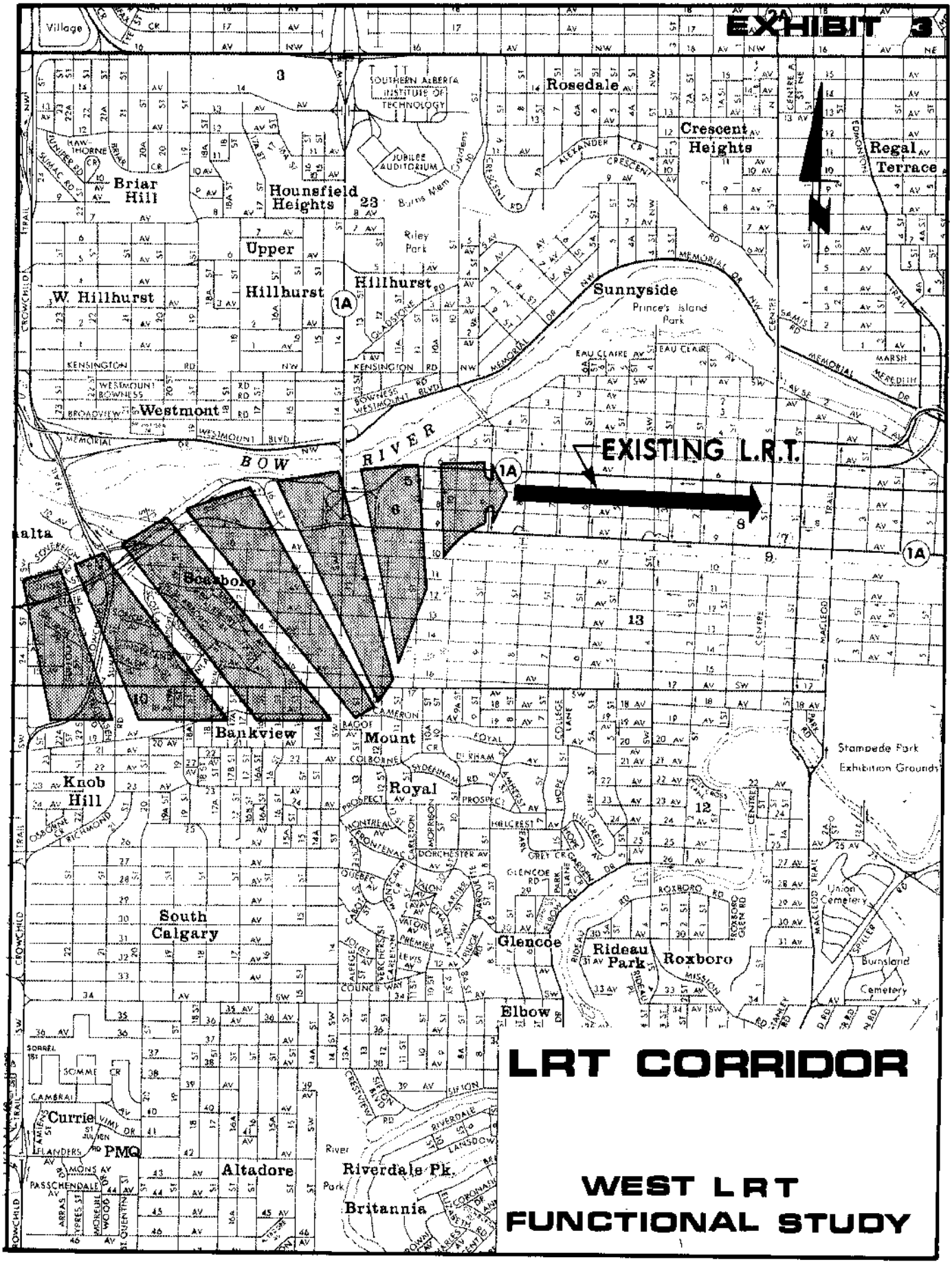


EXHIBIT 3
EXISTING L.R.T.
LRT CORRIDOR
WEST LRT
FUNCTIONAL STUDY
Rosedale
Crescent Heights
Regal Terrace
Briar Hill
Hounsfield Heights
Upper Hillhurst
Hillhurst
W Hillhurst
Sunnyside
Prince's Island Park
Westmont
BOW RIVER
Beaubow
Bankview
Mount Royal
Knob Hill
South Calgary
Glencoe
Rideau Park
Roxboro
Elbow
Currie
PMQ
Altadore
Riverdale Pk.
Britannia
Stampede Park
Exhibition Grounds
Union Cemetery
Burnsland Cemetery
Southern Alberta Institute of Technology
Jubilee Auditorium
Riley Park

3. Define the operating characteristics of the West LRT line and determine the number of Light Rail Vehicles required to satisfy the predicted travel demand.

4. Estimate the capital costs of implementation of the recommended West LRT line and associated facilities.

5. Determine the feasibility and need for a north-south LRT spur line which could serve the southern part of the Study Area (Exhibit 3)

1.4 Study Organization

Three study teams were formed to conduct the West LRT Functional Study:

- The **Project Team,** comprising a core group of Transportation and Planning Department staff, primarily responsible for conducting the study and for preparing the Study Report.

- The **Technical Team,** a multi-disciplinary group of technical staff from various City departments and from Alberta Transportation, to provide detailed technical information to the Project Team as required.

- The **Public Advisory Team,** an informal group representing Community Associations, business groups and institutions within the West LRT Study Area.

The study process for the West LRT Functional Study is illustrated in Exhibit 4.

FALL 1980

EXHIBIT 4

CITIZEN INPUT

STAGE 1
STUDY ORGANIZATION

- Define planning objectives, study activities and timing.
- Establish contact with community and business representatives.

STAGE 2
BACKGROUND DATA COLLECTION

- Determine existing conditions: transportation, land use, community characteristics, natural environment, and engineering constraints.

STAGE 3
IDENTIFY ROUTE ALTERNATIVES

- Identify preliminary route alternatives.
- Carry out a preliminary assessment of the alternatives, in terms of environmental, community, transportation, financial, and land use impacts.
- Present and review alternatives with community and interest group representatives.

PUBLIC INFORMATION CENTRE

STAGE 4
EVALUATE ROUTE ALTERNATIVES

- Develop a "short list" of feasible alternatives, based on the preliminary assessment.
- Undertake a detailed evaluation of the feasible alternatives to determine the one (s) that best satisfies the planning objectives.
- Meet with community and interest group representatives.
- Prepare study recommendations.

PUBLIC INFORMATION CENTRE

STAGE 5
STUDY DOCUMENTATION

- Prepare draft report.
- Prepare final report.
- Meet with community and interest group representatives.

STAGE 5
STUDY APPROVAL PROCESS

- Present study recommendations to non-statutory public hearing of City Council.

MARCH 1983

STUDY PROCESS

WEST LRT
FUNCTIONAL
STUDY

2.0 WEST LRT CORRIDOR

2.1 Approved Policies

Council policies which directly affect the West LRT are derived from the following approved documents:

Strathcona Design Brief - 1978
Recommended an LRT alignment in the median of the proposed 17 Avenue S.W. in Strathcona, between Sarcee Trail and 69 Street W.

Southwest Roads Study - 1979
Recommended that an LRT right-of-way along 17 Avenue S.W. between 37 Street W. and Sarcee Trail be protected by acquiring the lands to the immediate north of 17 Avenue S.W.

Transportation System Bylaw 3M82 - 1982
Specified the alignment of the West LRT as:
"Westward from 37th Street S.W. along 17 Avenue S.W. to the west City Limit. Downtown to 37th Street S.W. to be determined".

2.2 Alternative Corridors

Approved Council Policies have defined the West LRT corridor to be along 17 Avenue S. between 37 Street W. and 69 Street W. For the section between 37 Street W. and the Downtown, two alternative corridors were identified:

- Bow Trail Corridor
- 17 Avenue Corridor

As described in Volume 2 Technical Report, feasible alternatives within each corridor were identified and evaluated. Based on a detailed evaluation, a "preferred" alignment was chosen for each corridor, as illustrated in Exhibit 5.

2.3 Bow Trail Corridor

The preferred Bow Trail LRT alignment begins at the existing LRT terminus on 7 Avenue S. at 9 Street W., runs in a westerly direction along 7 Avenue S., curves gradually to the southwest at 11 Street W., passes through the esplanade of the Planetarium and Mewata Stadium lands , enters the median of the future 9 Avenue S. at 14 Street W., passes underneath the Bow Trail eastbound lanes to enter the Bow Trail median, crosses over 9 Avenue S., the CP Rail tracks, and 10 Avenue S., follows the median of the future proposed Bow Trail, enters an underground section to cross underneath 33 Street W., remains on an underground alignment through the Westbrook Mall property, surfaces in the median of 17 Avenue S. west of 37 Street W., and follows the median of 17 Avenue S. to 69 Street W.

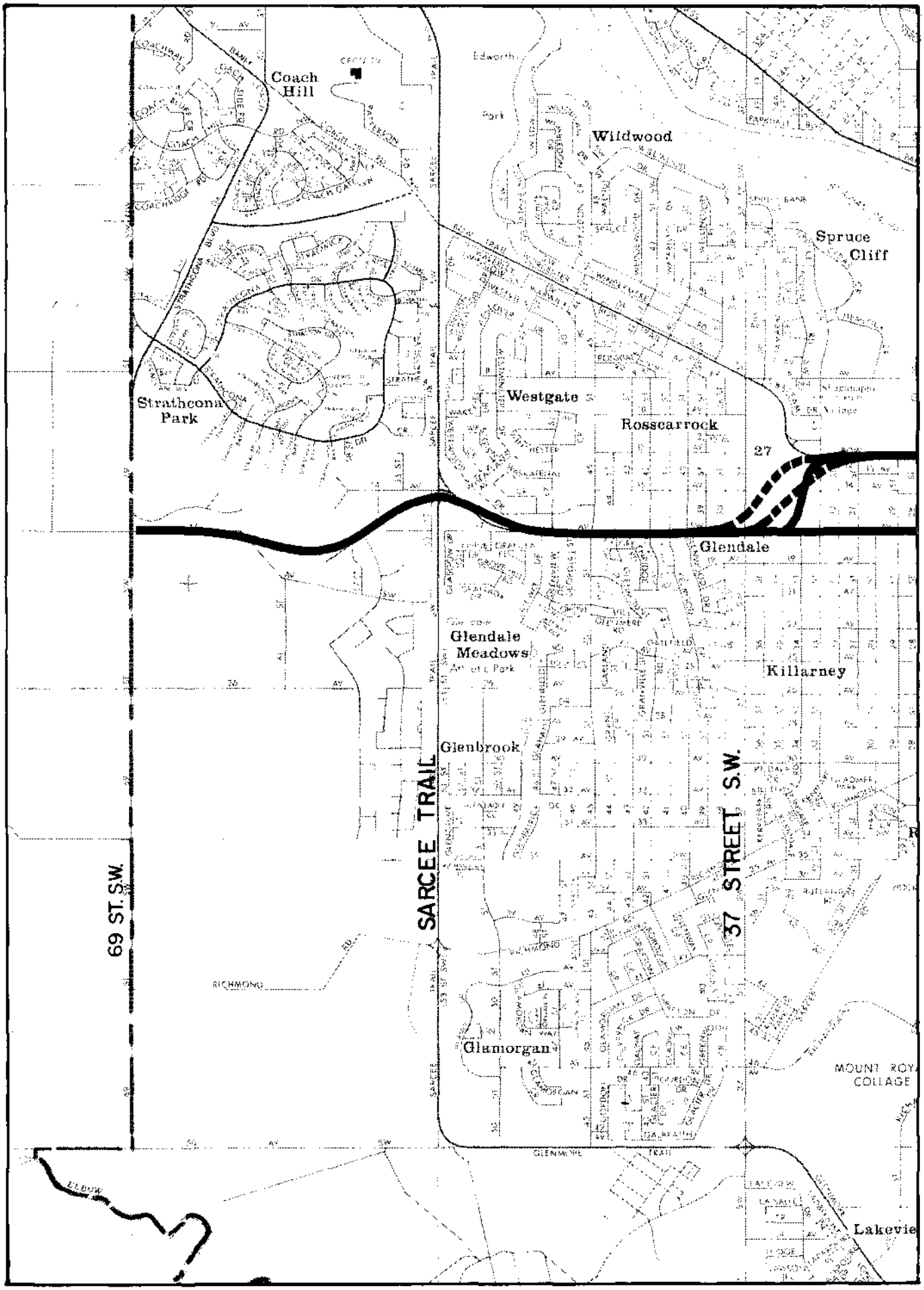
On the Bow Trail alignment LRT stations would be located at:

- Westbound station on 7 Avenue S. between 9 Street W. and 10 Street W.
- Eastbound station on 7 Avenue S. between 10 Street W. and 11 Street W.
- 17 Street W.
- 29 Street W.
- Westbrook Mall
- 45 Street W.
- Sarcee Trail
- 69 Street W.

For the purposes of comparison, it was assumed that Alternative III-a (Underground Through Westbrook Mall) would form part of the Bow Trail Corridor.

2.4 17 Avenue Corridor

The preferred 17 Avenue LRT corridor alignment begins at the existing LRT terminus on 7 Avenue S., enters into an underground section at 10 Street W., turns to the south and runs along the west side of 11 Street W., surfaces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Wildwood
Spruce Cliff
Strathcona Park
Westgate
Rosscarrock
27
Glendale
Glendale Meadows
Killarney
Glenbrook
SARCEE TRAIL
37 STREET S.W.
69 ST. S.W.
Glamorgan
Lakeview

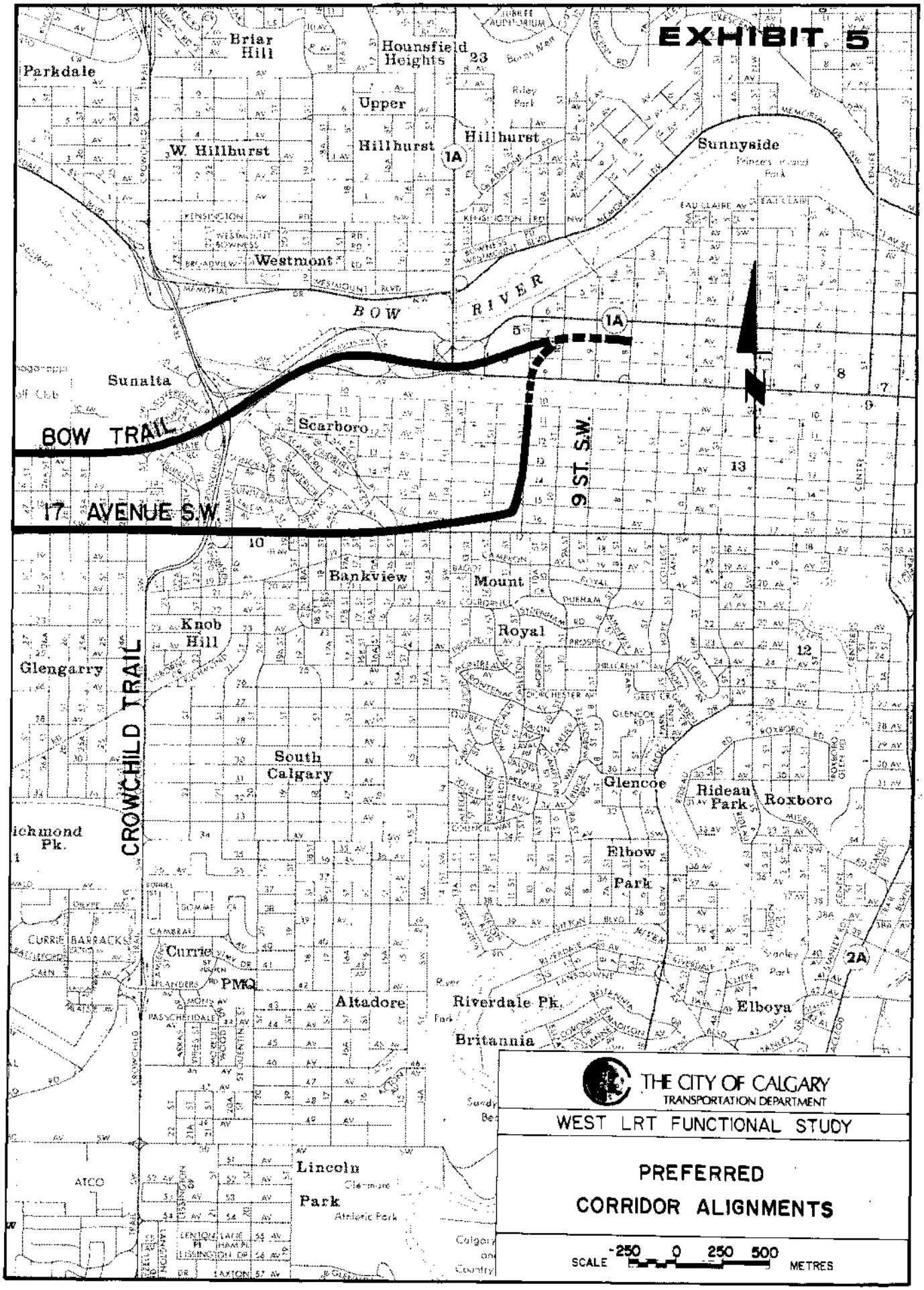


EXHIBIT 5
Briar Hill
Hounsfield Heights
Parkdale
Upper Hillhurst
W. Hillhurst
Hillhurst
Sunnyside
Westmont
BOW RIVER
Sunalta
BOW TRAIL
Scarboro
9 ST. S.W.
17 AVENUE S.W.
Bankview
Mount Royal
Knob Hill
Glengarry
CROWCHILD TRAIL
South Calgary
Glencoe
Rideau Park
Roxboro
Elbow Park
Currie Barracks
Currie
PMQ
Altadore
Riverdale Pk.
Elboya
Britannia
Lincoln Park
ATCO
THE CITY OF CALGARY
TRANSPORTATION DEPARTMENT
WEST LRT FUNCTIONAL STUDY
PREFERRED
CORRIDOR ALIGNMENTS
SCALE -250 0 250 500 METRES

within the 11 Street right-of-way south of 12 Avenue S., curves to the west into the median of 16 Avenue S., follows the north side of 17 Avenue S. from 16 Street W. to 35 Street W., passes underneath 37 Street W. to enter the median of 17 Avenue S., and stays in the median of 17 Avenue to 69 Street W.

On the 17 Avenue LRT alignment, stations would be located at:

- 11 Street W./14 Avenue S.
- 17 Street W.
- Crowchild Trail
- 29 Street W. (Optional)
- 33 Street W.
- 45 Street W.
- Sarcee Trail
- 69 Street W.

2.5 Recommended Corridor

A summary of the corridor evaluation is contained in Table 1.

Based on the evaluation criteria, the primary advantage of the 17 Avenue corridor is the increased LRT ridership.

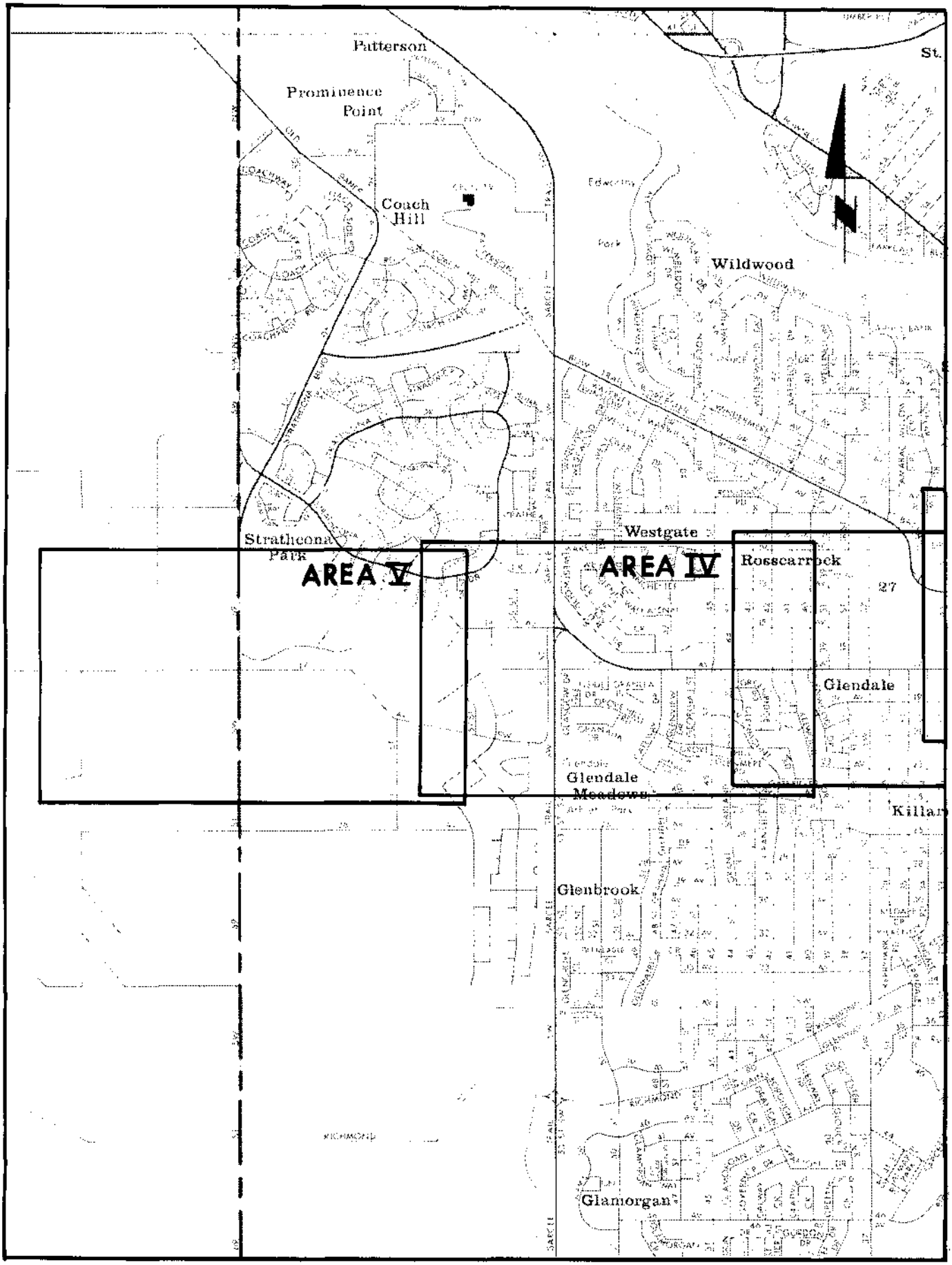
For all other criteria the Bow Trail corridor is superior. It would serve the major residential and commercial developments in upstream communities such as Strathcona while minimizing the impact on established downstream communities in the Inner City. Generally, the Bow Trail alignment would minimize land costs, property management difficulties, community impact, environmental impacts, and land requirements. Furthermore, it would provide excellent opportunities for the full integration of future developments with the LRT stations.

For these reasons, **the recommended corridor for the West LRT is the Bow Trail corridor.**

TABLE 1

CORRIDOR COMPARISON

Community Implications	Bow Trail Corridor	17 Avenue Corridor
Single family homes removed	18	68
Multiple family homes removed	18	141
Total homes removed	36	209
Commercial structures removed	10	13
Businesses displaced	13	19
Other affected features	Kerby Centre, Mewata Stadium, Golf Course Westbrook Mall	Kerby Centre, park in Connaught, Funeral Chapel, Salvation Army Village High impacts perceived along 17 Avenue
Land Use		
Service to West end Downtown	Excellent	None
Integration with Westbrook redevelopment	Excellent	Moderate
Increased redevelopment pressure on Inner City communities	Low	High
Other advantages	Integrate with redevelopment in North Sunalta.	Serves Inner City
Transportation System		
LRT ridership (pass./day) (2010)	42,000	52,000
Total transit ridership per day (across 14 St. screenline)	72,000	72,000
LRT operations	Good	Acceptable
LRT round trip time	35 minutes	40 minutes
Costs		
LRT	$110 m.	$115 m.
Associated Roadwork	$ 16 m.	$ 12 m.
Land	$ 52 m.	$ 87 m.
LRV's	$ 31 m.	$ 35 m.
Total	**$209 m.**	**$249 m.**


Patterson
Prominence Point
Couch Hill
Wildwood
Strathcona Park
AREA V
Westgate
AREA IV
Rosscarrock
Glendale
Glendale Meadows
Glenbrook
Glamorgan

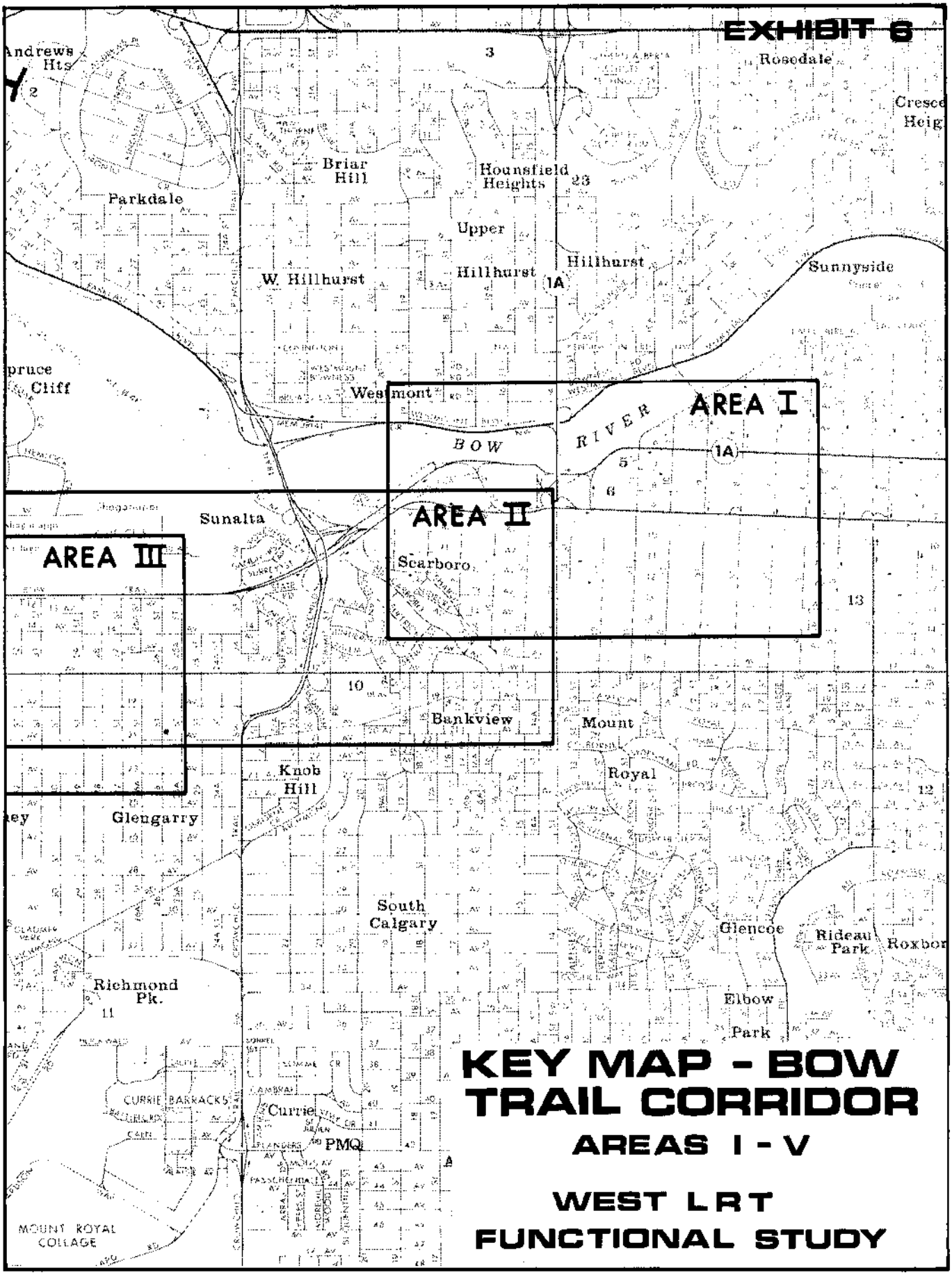


EXHIBIT 6
Andrews Hts
Rosedale
Briar Hill
Hounsfield Heights
Parkdale
Upper Hillhurst
W. Hillhurst
Hillhurst
Sunnyside
Spruce Cliff
Westmont
AREA I
BOW RIVER
AREA II
Sunalta
AREA III
Scarboro
Bankview
Mount Royal
Knob Hill
Glengarry
South Calgary
Glencoe
Rideau Park
Richmond Pk.
Elbow Park
CURRIE BARRACKS
Currie
PMQ
MOUNT ROYAL COLLAGE
KEY MAP - BOW TRAIL CORRIDOR
AREAS I - V
WEST LRT FUNCTIONAL STUDY

3.0 RECOMMENDATIONS

The recommended Bow Trail Corridor has been divided into five areas for convenience, as shown in Exhibit 6.

3.1 Area 1 (9 Street W. to 18 Street W.)

For Area 1 from 9 Street W. to 18 Street W., it is recommended:

1. That the right-of-way be protected for West LRT alignment as illustrated in Exhibits 7 and 8. From the existing LRT terminus on 7 Avenue S. between 9 Street W. and 8 Street W., the alignment runs west along 7 Avenue S. to 10 Street W., curves to the southwest through the Kerby Centre property and Mewata Stadium, enters the median of the future 9 Avenue S., passes over 14 Street W., and crosses 16 Street W. at-grade.

2. That an eastbound station be located between 10 Street W. and 11 Street W. and a westbound station between 9 Street W. and 10 Street W.

3. That a station be located at 17 Street W., north of 9 Avenue S. (Sunalta Station).

4. That 7 Avenue S. between 10 Street W. and 11 Street W. be realigned to match the LRT alignment.

5. That the ultimate Bow Trail, as recommended in the Bow Trail Connector Preliminary Design Study, be constructed from Crowchild Trail to 7 Street W., in conjunction with or prior to the construction of the West LRT.

6. That the Sunalta Area Redevelopment Plan process continue to develop LRT supportive land use policies for the lands located north of the CP Rail tracks.

7. That, pending approval of land use policies in the North Sunalta Station Area, development of the lands located north of the railway tracks conform with the following interim land use objectives:

   (a) To promote the development of medium to high density LRT supportive uses (i.e. uses which encourage transit ridership) in the Station Area;

   (b) To ensure the provision of convenient access to and from LRT stations by way of a pedestrian walkway system as an integral part of LRT supportive development;

   (c) To promote LRT supportive uses which respect the integrity of adjacent land uses;

   (d) To ensure that the magnitude of LRT supportive development is compatible with the capacities and design of the overall transportation network;

   (e) To recognize approved planning policies which have been prepared with due consideration to a rapid transit corridor.

8. That the Transportation Department obtain approval from Alberta Housing and Public Works for the acquisition of an LRT easement across the Kerby Centre property.

9. That the Administration consult with representatives of the Kerby Centre and Alberta Housing and Public Works prior to construction of the West LRT, in order that sufficient time be available for the relocation and/or reconstruction of the Kerby Centre.

10. That the Transportation Department develop, in conjunction with the Parks/Recreation Department and Calgary Centennial Planetarium, a plan for the Planetarium area to resolve issues related to vehicular access, pedestrian access, parking, internal vehicular circulation, and

EXHIBIT 7

WESTMOUNT

BOW RIVER

MEWATA BRIDGE

LOUISE BRIDGE

Future L.R.T. Bridge

BOW TRAIL

MATCH LINE

Area Subject To Redevelopment

Proposed Greyhound Terminal

Sunalta LRT Station

Pedestrian Link to Greyhound Terminal Site

LRT Substation Site

Pedestrian Overpass

C.P.R.

PROPOSED ℄

Storage Track

Planetarium

Proposed AHC Development

Kerby Centre

EASTBOUND PLATFORM

WESTBOUND PLATFORM

5 Car Stations

Future N.W. L.R.T.

Connection To Existing L.R.T. On 7 Avenue

Mewata Armoury

3 AVENUE S.W.

4 AVENUE S.W.

5 AVENUE S.W.

6 AVENUE S.W.

7 AVENUE S.W.

8 AVENUE S.W.

9 AVENUE S.W.

10 AVENUE S.W.

11 AVENUE S.W.

12 AVENUE S.W.

18 STREET

14 STREET S.W.

11 STREET S.W.

10 STREET S.W.

9 STREET S.W.

SUNALTA

CONNAUGHT

THE CITY OF CALGARY
TRANSPORTATION DEPARTMENT

WEST LRT FUNCTIONAL STUDY

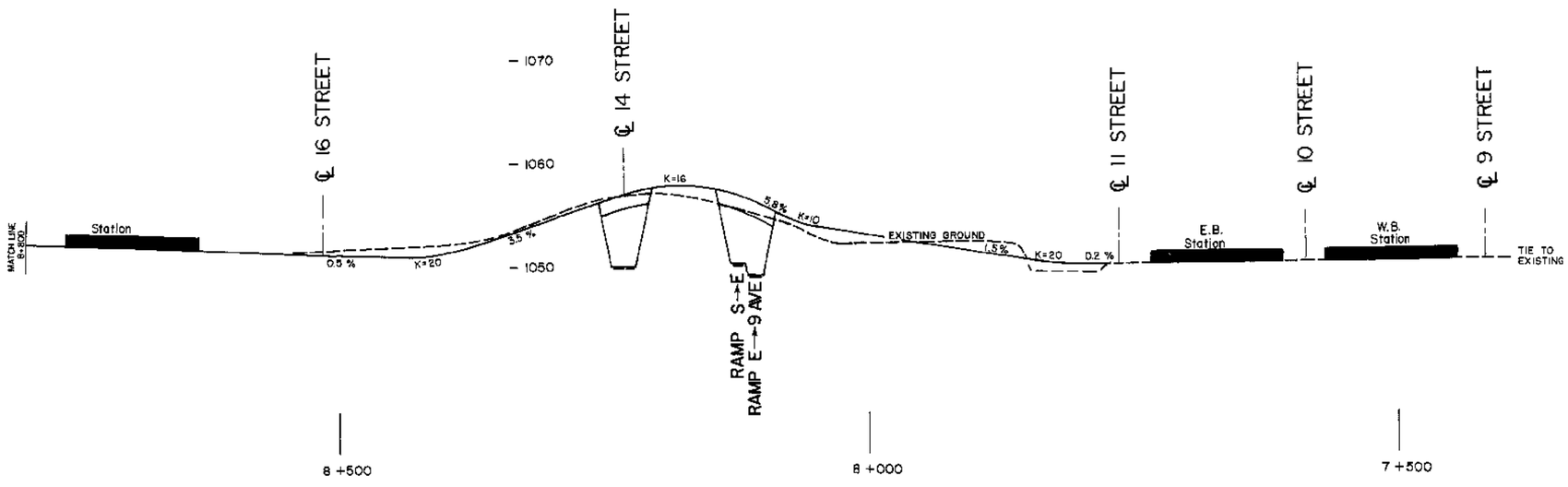
RECOMMENDED ALIGNMENT

9 STREET W. TO 18 STREET W.

SCALE -50 0 50 100 METRES

CITY OF CALGARY—TRANSPORTATION DEPARTMENT

EXHIBIT 8



THE CITY OF CALGARY
TRANSPORTATION DEPARTMENT

WEST LRT FUNCTIONAL STUDY

RECOMMENDED PROFILE

9 STREET W. TO 18 STREET W.

SCALE -50 0 50 100 HORIZONTAL METRES
-5 0 5 10 VERTICAL

CITY OF CALGARY – TRANSPORTATION DEPARTMENT

right-of-way requirements and that a structural study be undertaken to confirm the structural integrity of the Calgary Centennial Planetarium for the recommended alignment.

11. That the Transportation Department obtain approval from the Department of National Defence and Alberta Culture for the acquisition of an LRT easement across the Mewata Armories property.

12. That the Transportation Department provide the necessary design features to minimize any vibration from the LRT on the Planetarium and Mewata Armories.

13. That an elevated pedestrian walkway be constructed over the CP Rail tracks to link the Sunalta Station with the area south of the tracks.

14. That any redevelopment of the GSL property provide for an elevated pedestrian walkway system to permit developments north of the CP Rail tracks between Crowchild Trail and 14 Street W. to link with the Sunalta Station.

3.2 Area II (18 Street W. to 31 Street W.)

For Area II from 18 Street W. to 31 Street W., it is recommended:

1. That the right-of-way be protected for the West LRT alignment as illustrated in Exhibits 9 and 10. From the Sunalta Station, the LRT crosses underneath the future eastbound lanes of Bow Trail, enters the median of Bow Trail, crosses underneath Crowchild Trail, and crosses 26 Street W. at-grade while remaining in the Bow Trail median.

2. That a station be provided in the median of Bow Trail at 29 Street W. (Shaganappi Station).

3. That an elevated pedestrian walkway be built over Bow Trail to link the Shaganappi Community with the Shaganappi Station.

4. That the Crowchild Trail/Bow Trail interchange be reconstructed prior to or in conjunction with the West LRT construction as shown in Exhibit 9, to accommodate the West LRT in the interchange area.

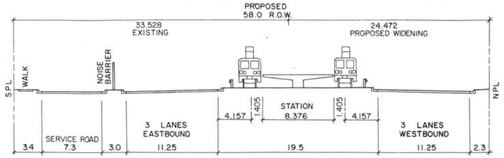
5. That Bow Trail from Crowchild Trail to 31 Street W. be reconstructed prior to or in conjunction with the West LRT construction, as shown in Exhibit 9, to accommodate the LRT in the median. All turns are allowed at 26 Street W., while only right-turns are permitted at 24 Street W.

6. That the existing land use designations in the vicinity of the proposed Shaganappi Station area be maintained.

7. That the merits of preparing an Area Redevelopment Plan for the Shaganappi Community be evaluated in the context of redevelopment pressures around the Station Area.

8. That the Transportation Department consult with representatives of the Shaganappi Golf Course, in order to minimize any negative effects on the golf course and to develop mitigative measures.

EXHIBIT 9



BOW TRAIL
LRT MEDIAN
CENTRE-LOAD STATION

Shaganappi Golf Course

Jacques Lodges

BOW TRAIL

Pedestrian Overpass

R=575

R=1000

R=3600

LRT Substation Site

Elevated Section

C. P. R.

SHAGANAPPI

SCARBORO

SUNALTA

KILLARNEY

14 AVENUE S.W.

17 AVENUE S.W.

10 AVENUE S.W.

11 AVENUE S.W.

12 AVENUE S.W.

33 STREET S.W.

32 STREET S.W.

31 STREET S.W.

29 STREET S.W.

28 STREET S.W.

27 STREET S.W.

26 STREET S.W.

24 STREET S.W.

19 STREET S.W.

18 STREET S.W.

16 STREET S.W.

15 STREET S.W.

CROWCHILD TRAIL

THE CITY OF CALGARY
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WEST LRT FUNCTIONAL STUDY

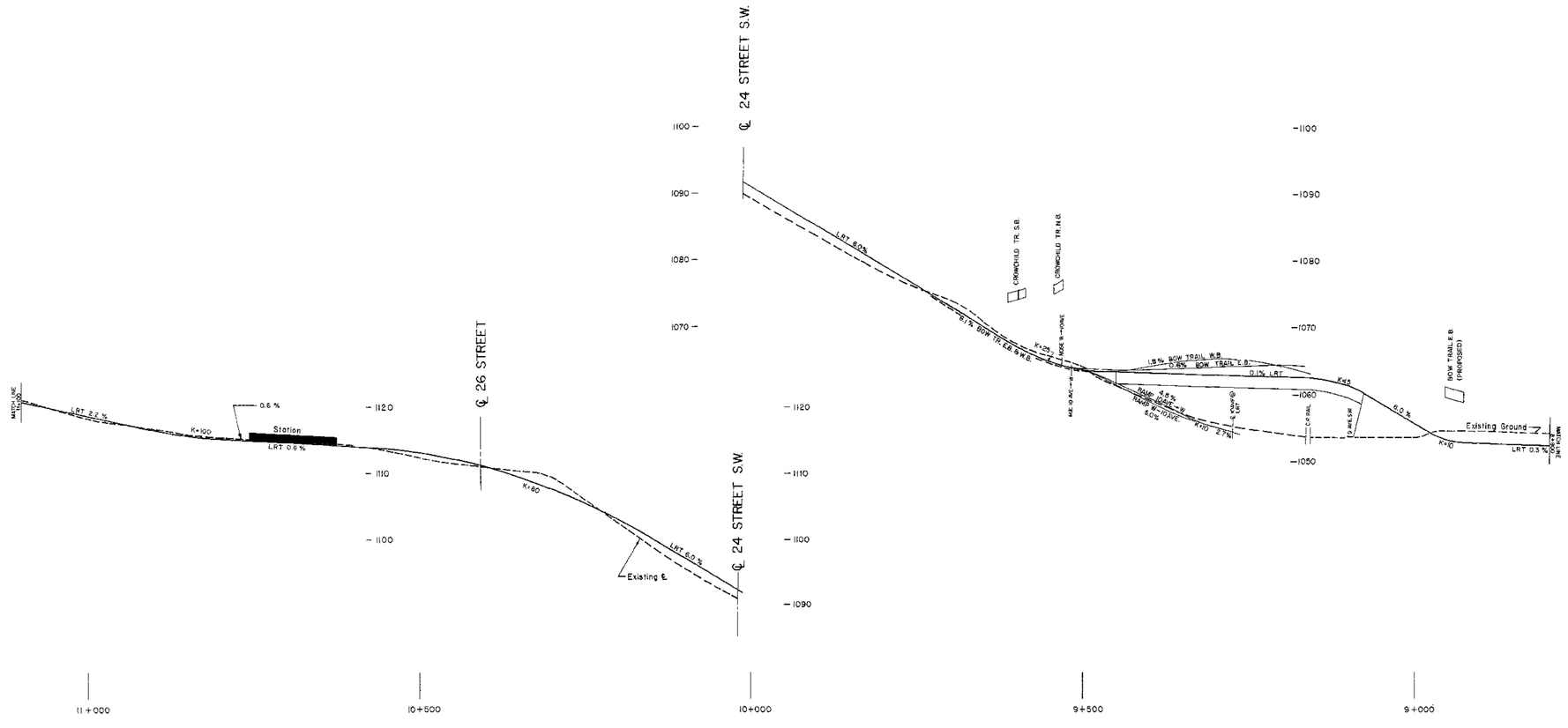
AREA II - BOW TRAIL CORRIDOR
18 STREET W. TO 31 STREET W.

ALTERNATIVE II-a MEDIAN OF BOW TRAIL

SCALE -50 0 50 100 METRES

CITY OF CALGARY - TRANSPORTATION DEPARTMENT

EXHIBIT 10



CITY OF CALGARY—TRANSPORTATION DEPARTMENT

THE CITY OF CALGARY
TRANSPORTATION DEPARTMENT

WEST LRT FUNCTIONAL STUDY

RECOMMENDED PROFILE

18 STREET W. TO 31 STREET W.

SCALE -50 0 50 100 HORIZONTAL METRES
-5 0 5 10 VERTICAL

9. That, prior to the LRT construction, the Transportation Department evaluate the potential for overspill parking at the Shaganappi Station, and propose remedial actions if necessary.

3.3 Area III (31 Street W. to 41 Street W.)

For Area III from 31 Street W. to 41 Street W., it is recommended:

1. That no final alignment for the West LRT between 31 Street W. and 41 Street W. be selected at this time.

2. That the Transportation Department report back to Council at a future date with a final recommendation for the LRT alignment in Area III, pending:

   (a) Further discussions with the Calgary Board of Education regarding alternative LRT routings through the Ernest Manning/Melville Scott school site.

   (b) Further discussions with the owners of Westbrook Mall regarding alternative LRT routings through the Mall property.

   (c) Completion of studies by the Calgary Board of Education on LRT alternatives through the Ernest Manning/Melville Scott school site.

3. That a detailed Station Area Land Use Study be undertaken for the lands in the vicinity of the Westbrook Station, in conjunction with resolution of an LRT alignment through Area III.

4. That the Planning Department be instructed to commence a Station Area Land Use Plan as soon as this can be scheduled into their work program.

5. That the lands contained within the Westbrook Station Study Area be placed under policy review until such time as ultimate land use policies are established.

6. That the City continue discussions with the Calgary Board of Education regarding LRT access through the Ernest Manning/Melville Scott school property in conjunction with potential redevelopment of these lands and

EXHIBIT 11

41 STREET S.W.

37 STREET S.W.

ROSSCARROCK

Westbrook Mall

R=260

11+400

LRT
Underground
Section

Possible Feeder
Bus Station

11+600

Ernest Manning
High School

Underground
Station

16 AVE.

35 ST.

Melville Scott
Junior High School

11+800

R=170

12+200

PROPOSED ℄

12+000

MATCH LINE STA.12+300

33 STREET S.W.

31 STREET S.W.

11+200

PROPOSED ℄

MATCH LINE STA.11+100

BOW TRAIL

Shaganappi Golf Course

SHAGANAPPI

17 AVENUE S.W.

KILLARNEY

GLENDALE

THE CITY OF CALGARY
TRANSPORTATION DEPARTMENT

WEST LRT FUNCTIONAL STUDY

AREA III - BOW TRAIL CORRIDOR

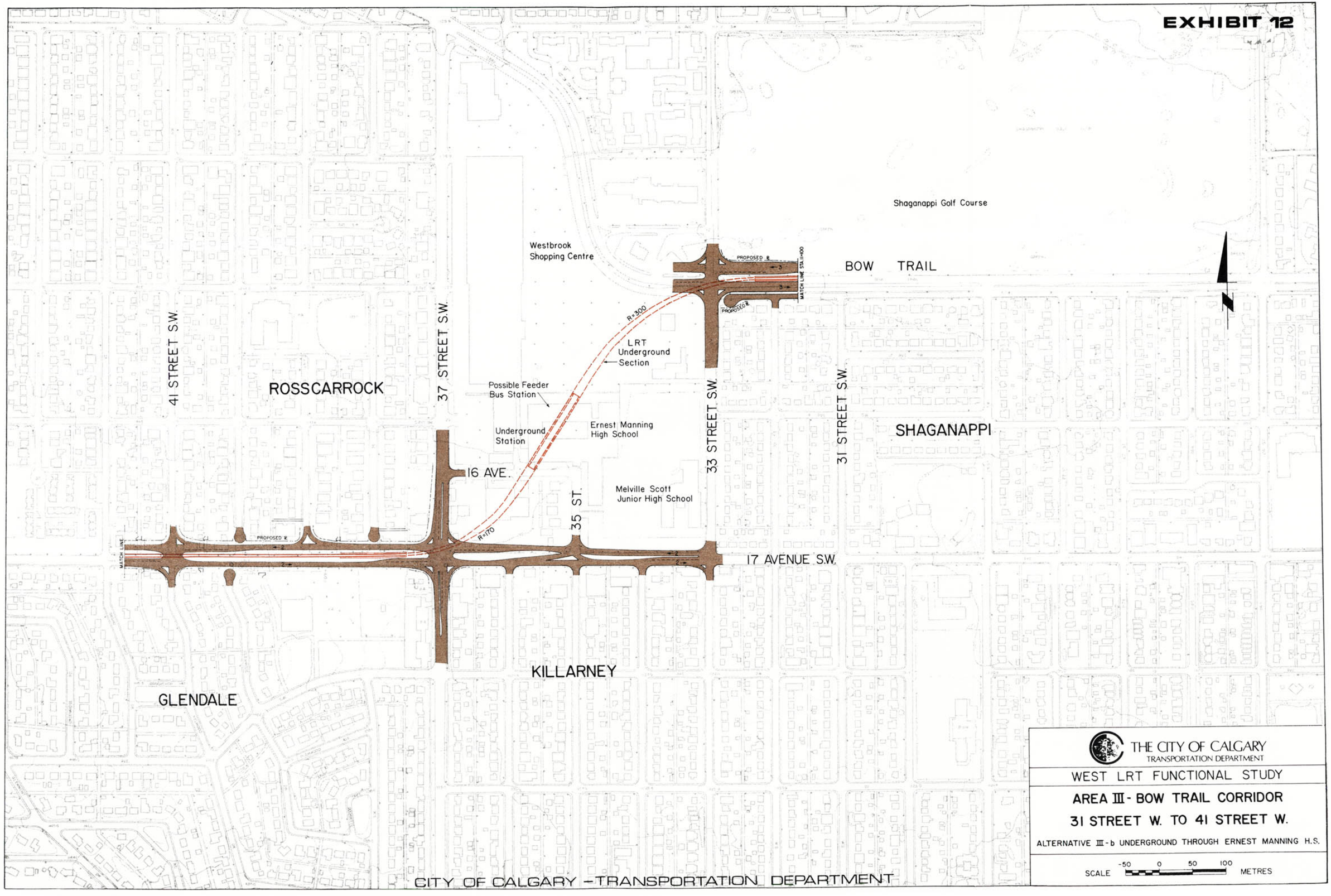
31 STREET W. TO 41 STREET W.

ALTERNATIVE III-a UNDERGROUND THROUGH WESTBROOK MALL

SCALE -50 0 50 100 METRES

CITY OF CALGARY - TRANSPORTATION DEPARTMENT

EXHIBIT 12



THE CITY OF CALGARY
TRANSPORTATION DEPARTMENT

WEST LRT FUNCTIONAL STUDY

AREA III - BOW TRAIL CORRIDOR

31 STREET W. TO 41 STREET W.

ALTERNATIVE III - b UNDERGROUND THROUGH ERNEST MANNING H.S.

SCALE -50 0 50 100 METRES

CITY OF CALGARY - TRANSPORTATION DEPARTMENT

EXHIBIT 13

Shaganappi Golf Course

LRT Underground Section

PROPOSED ℄

MATCH LINE SEE H-100

BOW TRAIL

Westbrook Mall

R=90

Possible Feeder Bus Station

41 STREET S.W.

37 STREET S.W.

ROSSCARROCK

Station

33 STREET S.W.

31 STREET S.W.

SHAGANAPPI

Ernest Manning High School

16 AVE.

35 ST.

Melville Scott Junior High School

LRT Underground Section

PROPOSED ℄

MATCH LINE

17 AVENUE S.W.

KILLARNEY

GLENDALE

THE CITY OF CALGARY
TRANSPORTATION DEPARTMENT

WEST LRT FUNCTIONAL STUDY

AREA III - BOW TRAIL CORRIDOR

31 STREET W. TO 41 STREET W.

ALTERNATIVE III - c AT GRADE THROUGH SCHOOL YARD

SCALE -50 0 50 100 METRES

CITY OF CALGARY - TRANSPORTATION DEPARTMENT

encourage and offer aid to the School Board in the resolution of the status of the properties.

7. That the City continue discussions with the owners of Westbrook Mall regarding alternative LRT routings through the Westbrook Mall property.

8. That, pending approval of ultimate land use policies for the Station Areas, the following interim land use objectives apply:

   (a) To protect the preferred LRT alignment options as illustrated in Exhibits 11, 12 and 13 until such time as a final alignment is determined;

   (b) To promote the development of medium density LRT supportive uses (i.e. uses which encourage transit ridership) in the Station Area;

   (c) To ensure the provision of convenient access to and from the LRT Station by way of a pedestrian walkway system as an integral part of LRT supportive development;

   (d) To promote LRT supportive uses which respect the integrity of adjacent land uses;

   (e) To ensure that the magnitude of LRT supportive development is compatible with the capacities and design of the overall transportation network;

   (f) To recognize approved planning policies which have been prepared with due consideration to a rapid transit corridor.

EXHIBIT 14

WESTGATE

ROSSCARROCK

GLENDALE MEADOWS

47 STREET S.W.

45 STREET S.W.

41 STREET S.W.

58 STREET S.W.

17 AVENUE S.W.

SARCEE TRAIL

NOTE: LRT West of Sarcee Trail is Within 17 Avenue R.O.W.

Station

Pedestrian Overpass

Feeder Bus Station And Park'n Ride

LRT Substation Site

Alberta Motor Association

Fire Station

Police Station

Westbound Station

Eastbound Station

PROPOSED ℄

AREA UNDER CONSTRUCTION

R=260

R=220

6+800

6+600

6+400

6+200

6+000

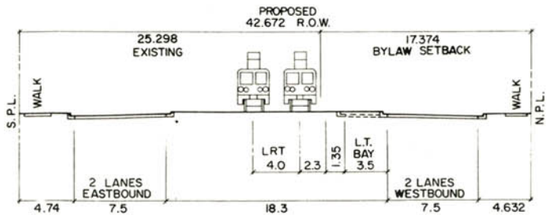
5+800

7+400

7+200

MATCH LINE STA 7+600

MATCH LINE CHAINAGE EQUATION 12+300 = 5+295



17 AVENUE S.W.
LRT MEDIAN
WEST OF 37 STREET

THE CITY OF CALGARY
TRANSPORTATION DEPARTMENT

WEST LRT FUNCTIONAL STUDY

RECOMMENDED ALIGNMENT

41 STREET W. TO 58 STREET W.

SCALE -50 0 50 100 METRES

CITY OF CALGARY – TRANSPORTATION DEPARTMENT

3.4 Area IV (41 Street W. to 58 Street W.)

For Area IV from 41 Street W. to 58 Street W., it is recommended:

1. That the right-of-way be protected for the West LRT alignment as illustrated in Exhibits 14 and 15. From 41 Street W., the LRT runs in the median of 17 Avenue S., crosses over the future realigned Sarcee Trail, and continues west in the median of the proposed 17 Avenue S. to 58 Street W.

2. That a station be provided in the median of 17 Avenue S. at 45 Street W., with an eastbound platform east of the intersection and a westbound platform west of 45 Street W.

3. That all pedestrian access to the 45 Street W. station be at-grade via the pedestrian crosswalks at the full-signalized 45 Street W. intersection.

4. That a station be provided in the median of the proposed 17 Avenue S., west of Sarcee Trail (Sarcee Station).

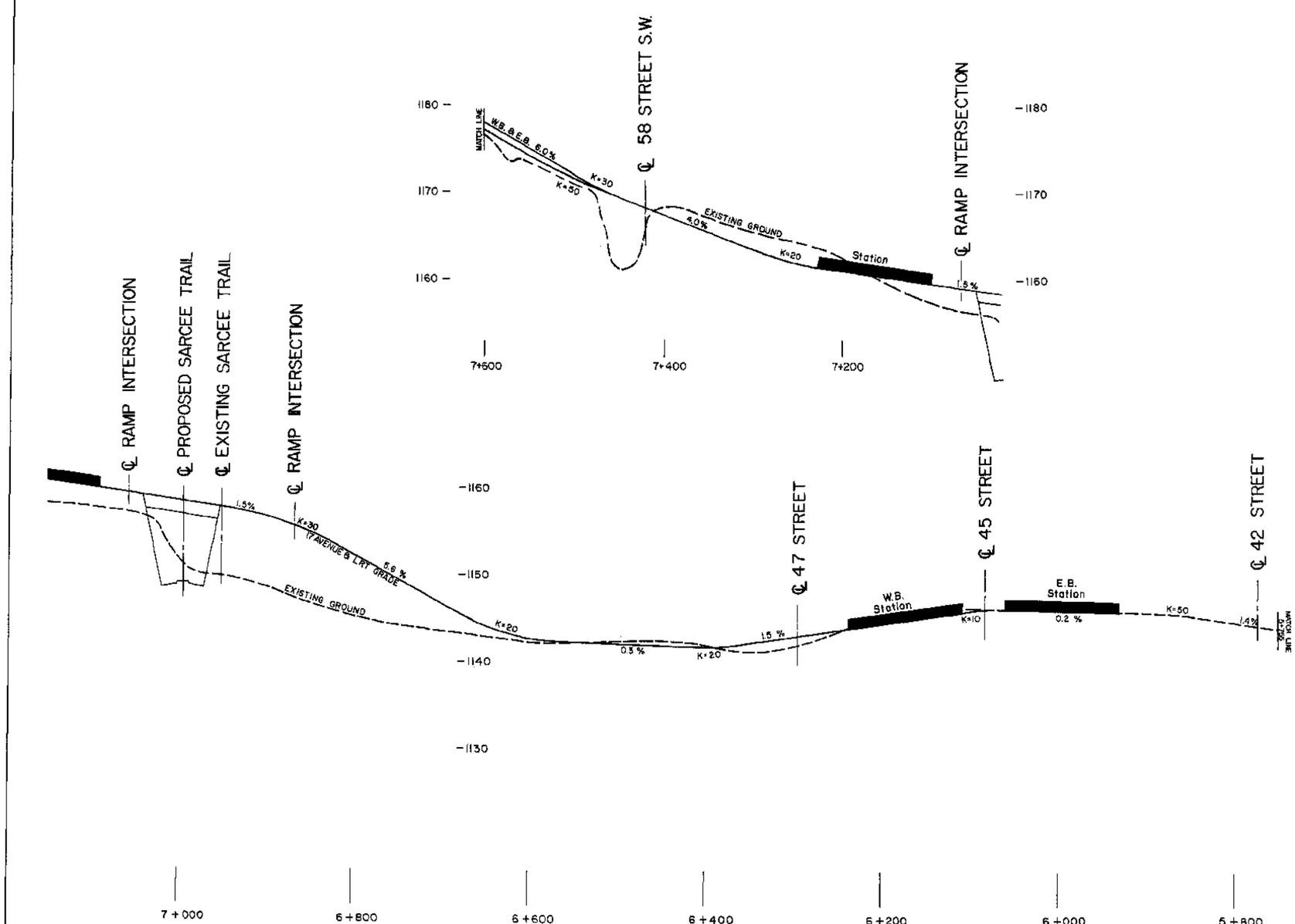
5. That the 3.63 ha. site at the southwest corner of Sarcee Trail and 17 Avenue S. be developed for park-n-ride (approximately 800 stalls), kiss-n-ride, and feeder bus facilities.

6. That an elevated pedestrian walkway be built over 17 Avenue S. to link the transit facilities and the area north of 17 Avenue S. with the Sarcee Station.

7. That 17 Avenue S. from 41 Street W. to Sarcee Trail be reconstructed prior to or in conjunction with the West LRT construction. At-grade intersections with all turns are allowed at 41 Street W., 45 Street W., the Sarcee Trail ramp intersections, and 58 Street W.

8. That the Sarcee Trail/17 Avenue S. interchange be constructed as shown in Exhibit 14, prior to or in conjunction with the West LRT construction.

EXHIBIT 16



THE CITY OF CALGARY
TRANSPORTATION DEPARTMENT

WEST LRT FUNCTIONAL STUDY

RECOMMENDED PROFILE

41 STREET W. TO 58 STREET W.

SCALE -50 0 50 100 HORIZONTAL METRES
-5 0 5 10 VERTICAL

CITY OF CALGARY – TRANSPORTATION DEPARTMENT

9. That the existing land use designations in the vicinity of the 45 Street W. Station Area be maintained.

10. That the merits of preparing Area Redevelopment Plans for the Rosscarrock/Westgate Communities be evaluated in the context of redevelopment pressures around the station areas.

11. That development within the Sarcee Trail Station Area conform with the approved Strathcona Design Brief.

3.5 Area V (58 Street W. to 69 Street W.)

For Area V from 58 Street W. to 69 Street W., it is recommended:

1. That the right-of-way be protected for the West LRT alignment as illustrated in Exhibits 16 and 17. From 58 Street W., the LRT runs in the median of the proposed 17 Avenue S., crosses 64 Street W. at-grade, and terminates east of 69 Street W.

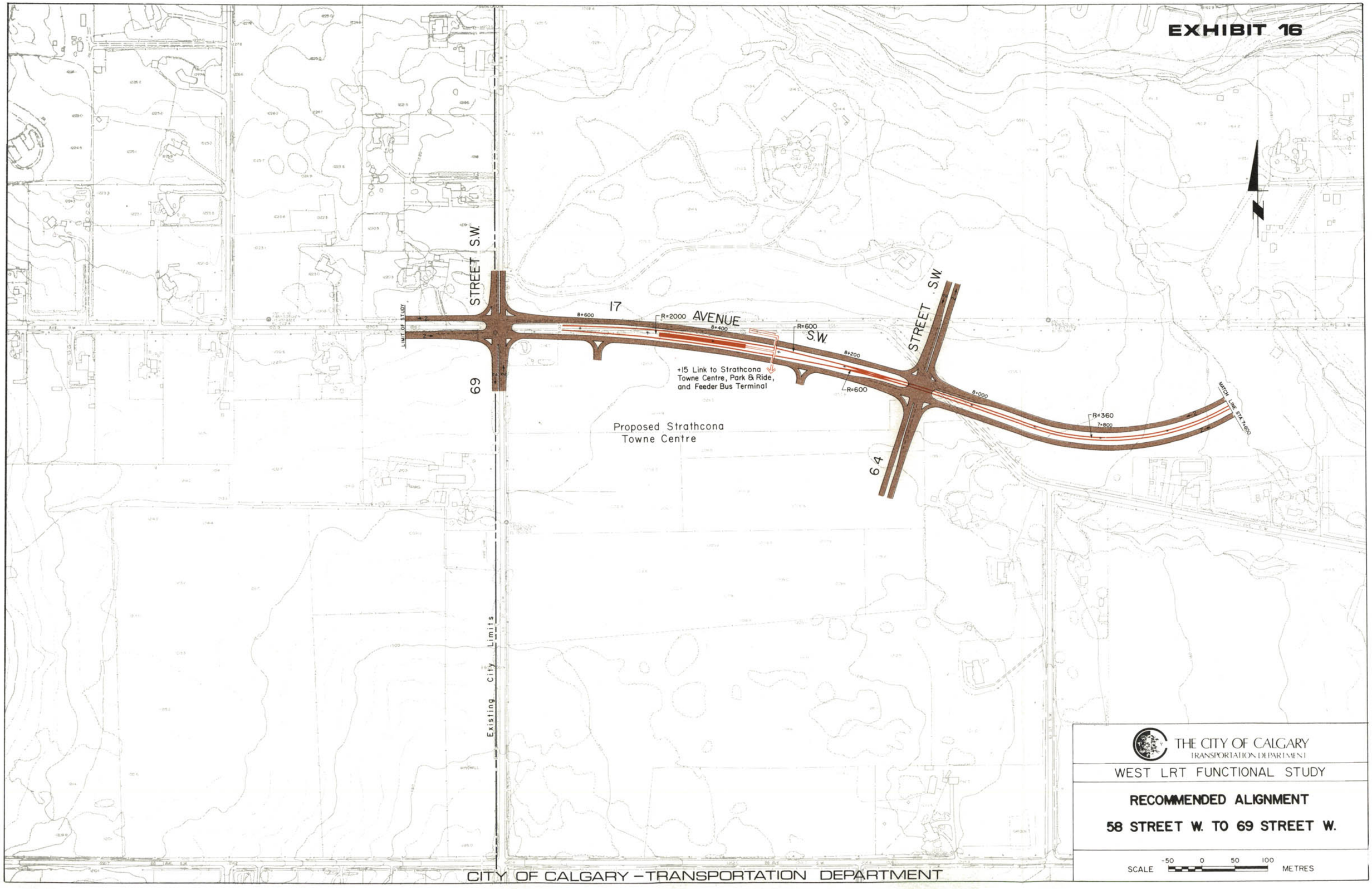
2. That a station be provided in the median of 17 Avenue S. east of 69 Street W. (Strathcona Station).

3. That a joint use park-n-ride facility with approximately 500 stalls and a feeder bus terminal be provided on the Strathcona Towne Centre site and that a Plus 15 pedestrian walkway be built to link the Strathcona Station, the area north of 17 Avenue S., the park-n-ride, feeder bus terminal, and the facilities of the Strathcona Towne Centre.

4. That development within the 69 Street Station area conform with the approved Strathcona Design Brief.

5. That future plans for 17 Avenue west of 69 Street provide for the possible future extension of LRT.

EXHIBIT 16



THE CITY OF CALGARY
TRANSPORTATION DEPARTMENT

WEST LRT FUNCTIONAL STUDY

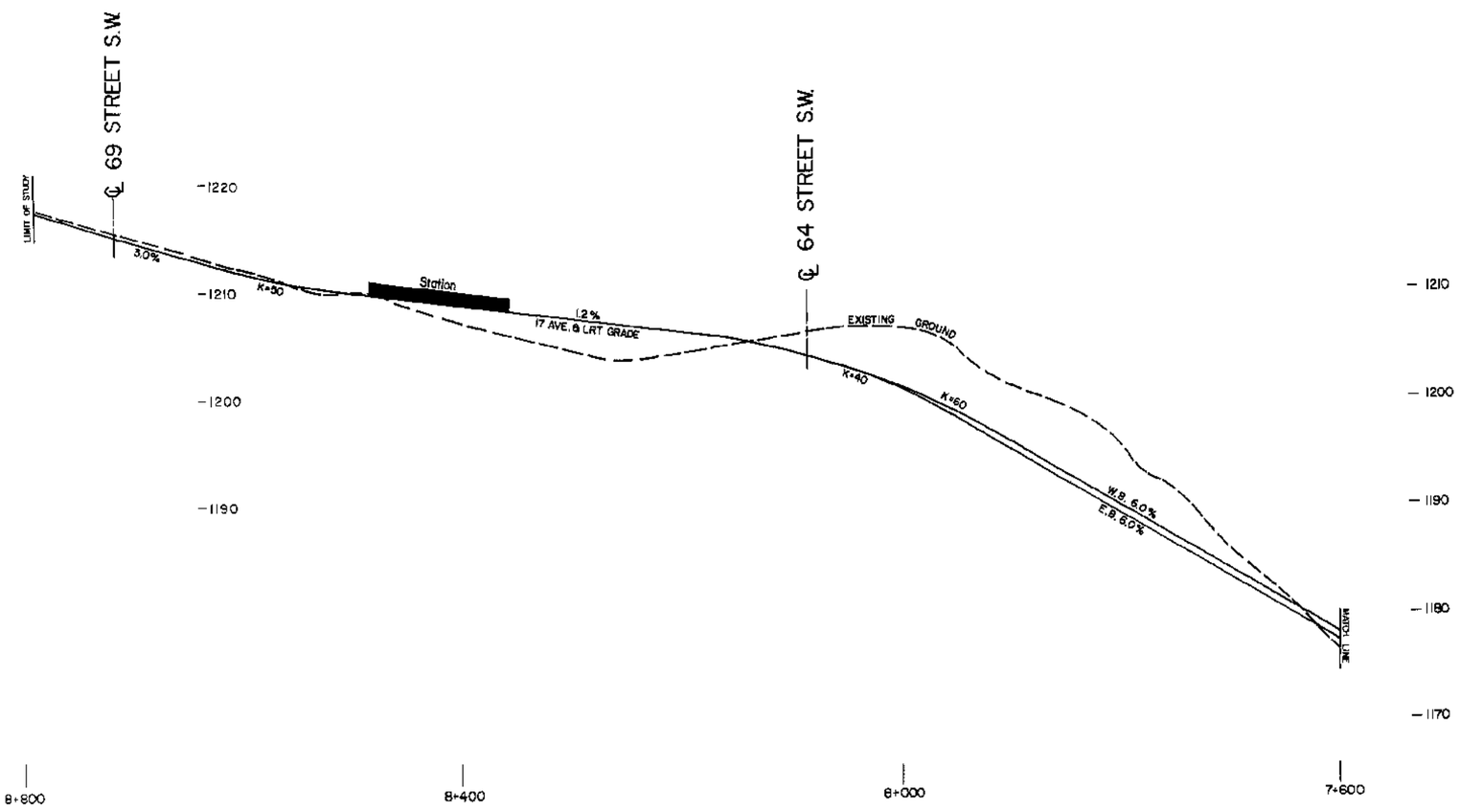
RECOMMENDED ALIGNMENT

58 STREET W. TO 69 STREET W.

SCALE -50 0 50 100 METRES

CITY OF CALGARY – TRANSPORTATION DEPARTMENT

EXHIBIT 17



THE CITY OF CALGARY
TRANSPORTATION DEPARTMENT

WEST LRT FUNCTIONAL STUDY

RECOMMENDED PROFILE

58 STREET W. TO 69 STREET W.

SCALE -50 0 50 100 HORIZONTAL METRES
-5 0 5 10 VERTICAL

4.0 OPERATIONAL CHARACTERISTICS

4.1 Route Length and Travel Time

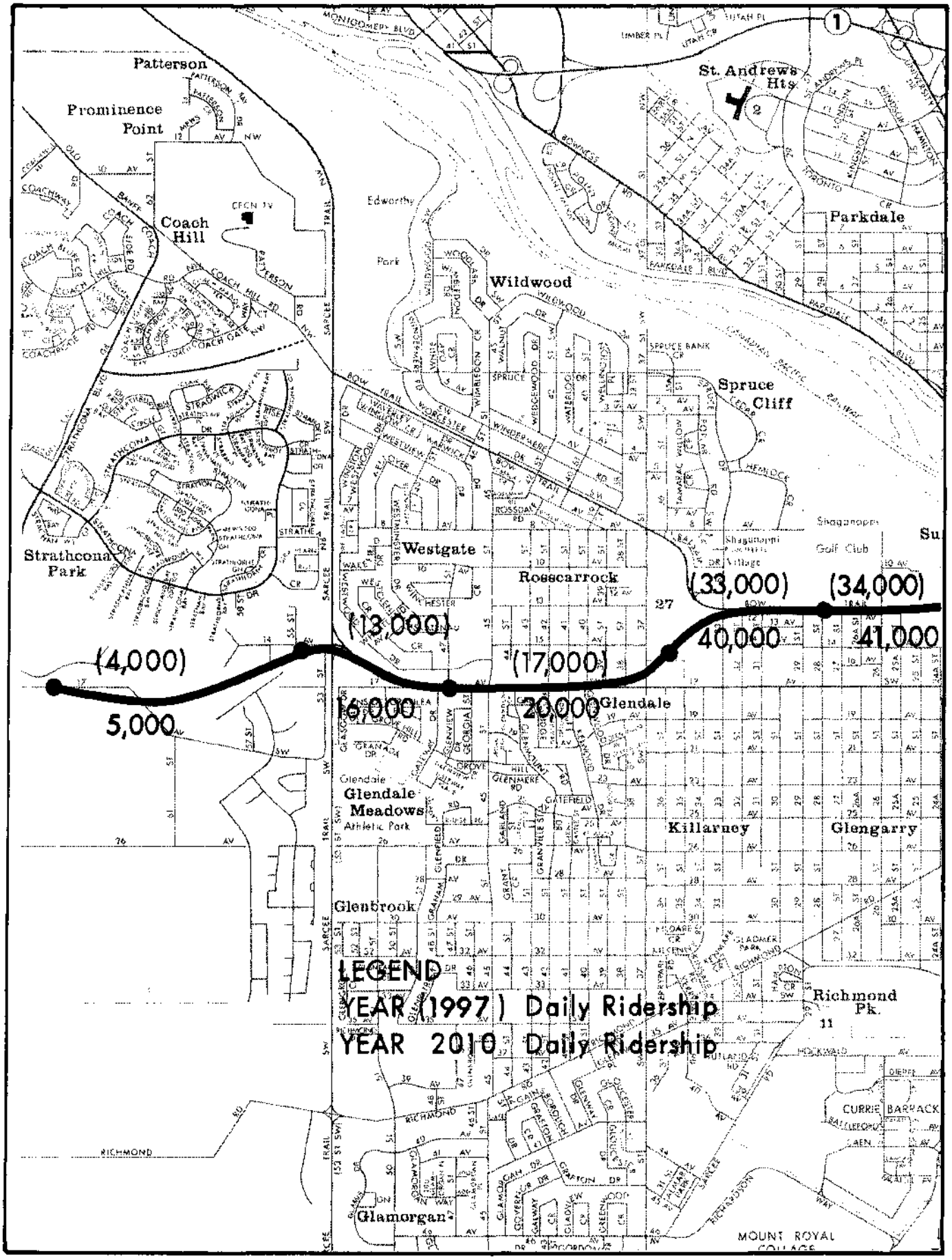
The total length of the recommended alignment for the West LRT, from the existing LRT terminus on 7 Avenue S. at 9 Street W. to the 69 Street W. terminal station, is 7.8 km. A trip from the 69 Street W. station to 9 Street W. in the downtown would take approximately 15 minutes. The total round trip travel time is expected to be approximately 35 minutes, including station stops.

It is anticipated that the West LRT and Northeast LRT lines will be combined to run as one continuous line from the Strathcona Town Centre Station at 69 Street W. and 17 Avenue S. to the Whitehorn Station at 36 Street and 39 Avenue N.E.

4.2 Ridership Projections and Vehicular Requirements

Exhibit 18 illustrates the projected weekday ridership for the recommended West LRT, for the years 2000 and 2010. The maximum load point occurs at the crossing of 14 Street W., where approximately 35,000 and 42,000 LRT passenger will cross per day in the years 2000 and 2010 respectively.

The West LRT track alignment and station designs have the flexibility to accommodate five-car trains, as do the South, Northeast, and Northwest LRT lines (outside the present 7 Avenue Transit Mall). However, it is planned that the Northeast LRT line will initially operate with maximum train lengths of three Light Rail Vehicles and consequently the West LRT may initially handle trains of this size if three-car trains provide sufficient capacity for the LRT ridership at that time. Since the Northeast LRT may have higher ridership than will the planned stages of the West LRT, the train size and frequency of service on the West LRT line may depend on the LRT requirements for the Northeast LRT.


Patterson
Prominence Point
Coach Hill
Edworthy Park
Wildwood
St. Andrews Hts
Parkdale
Spruce Cliff
Strathcona Park
Westgate
Rosscarrock
Shaganappi Golf Club
Glendale
Glendale Meadows Athletic Park
Killarney
Glengarry
Glenbrook
Richmond Pk.
Currie Barracks
Glamorgan
Mount Royal College
(4,000)
5,000
(13,000)
16,000
(17,000)
20,000
(33,000)
40,000
(34,000)
41,000
LEGEND
YEAR (1997) Daily Ridership
YEAR 2010 Daily Ridership

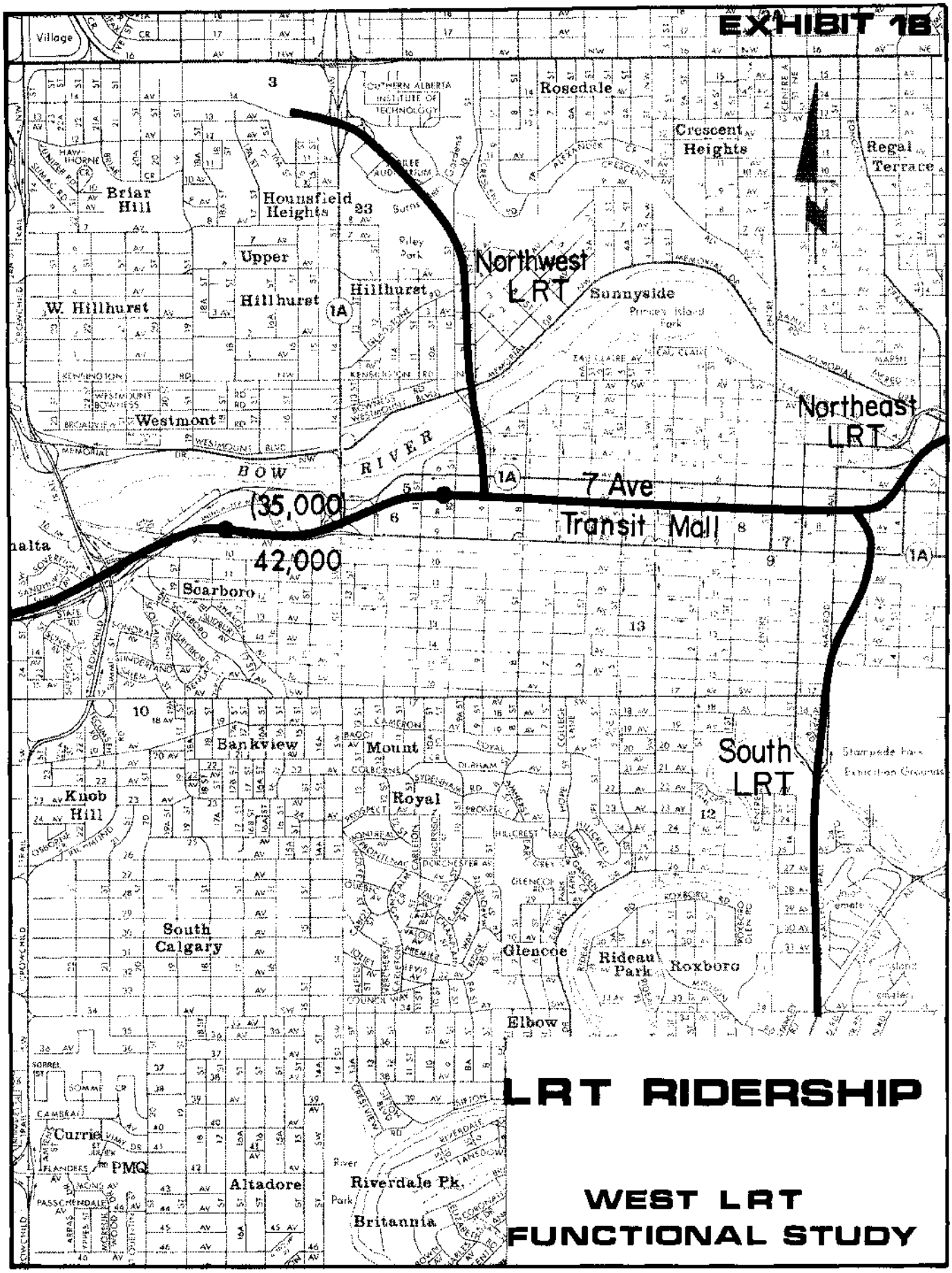


EXHIBIT 1B
Northwest LRT
Northeast LRT
South LRT
7 Ave Transit Mall
35,000
42,000
Rosedale
Crescent Heights
Regal Terrace
Briar Hill
Hounsfield Heights
Upper Hillhurst
Hillhurst
W. Hillhurst
Sunnyside
Westmount
BOW RIVER
Scarboro
Bankview
Mount Royal
Knob Hill
South Calgary
Glencoe
Rideau Park
Roxboro
Elbow
Currie
PMQ
Altadore
Riverdale Pk.
Britannia
LRT RIDERSHIP
WEST LRT
FUNCTIONAL STUDY

LRT service with three-car trains at five minute headways in the peak periods will provide a capacity of 5,800 to 9,560 passengers/peak hour/peak direction. Based on a round trip travel time of 35 minutes and the projected passenger volumes, the West LRT will require 24 Light Rail Vehicles (21 in operation plus 3 maintenance spares) for initial operation.

The exact vehicular requirements for the West LRT would be reviewed at a later date, when more information is available on the ridership on the Northeast LRT and the timing of construction of the West LRT line.

4.3 Mode of Access

West LRT transit patrons will travel to and from the stations by a variety of modes: walking, cycling, kiss 'n' ride, park 'n' ride, and feeder bus. It is estimated that the mode of access to the stations by LRT users will be as follows:

Walk on and bicycle	5%
Kiss 'n' ride (passenger drop off)	5 - 10%
Park 'n' ride	10 - 12%
Feeder Bus	75%

Using the 10 - 12% factor for park 'n' ride, approximately 1,300 to 1,600 park 'n' ride stalls will be required along the West LRT line. However, only two stations are expected to have park 'n' ride facilities: the 69 Street W. station with 500 joint use parking stalls in the Strathcona Town Centre, and the Sarcee Trail station with about 800 stalls, providing a total of 1,300 stalls.

If it is considered necessary to provide additional parking facilities for LRT users, a park 'n' ride structure could be built adjacent to the Westbrook Mall station, but with extremely high land and construction costs.

When the West LRT line is implemented, the bus network in West Calgary will be re-oriented, in order that feeder buses link the areas north and south of the LRT line to the proposed stations. Major feeder bus

connections will be provided at the Strathcona Town Centre station, the Sarcee Trail station, and the Westbrook Mall station. The 45 Street station will also have feeder bus connections.

The general area served by the LRT feeder bus network will be the area west of 29 Street W. It is expected that the remaining area east of 29 Street W. will be served by a bus network similar to the existing one, and will not be directly linked to the West LRT, with the exception of North Sunalta. Even so, close to 60 percent of all transit riders in West Calgary crossing 14 Street W. will be using the West LRT.

Before any revisions are made to existing bus routes, all local communities affected by bus route changes will be consulted. The required revisions to the bus network will be developed in conjunction with residents of the affected communities.

5.0 COST ESTIMATES

The estimated costs of implementing the West LRT and the associated facilities from 9 Street W. to 69 Street W. are presented below.

All costs are in **1983 dollars.**

5.1 Costs by Area

Area I - 9 Street W. to 18 Street W.	
LRT Construction	$10 million
Associated Roadworks	$ 1 million
Land Acquisition	$17 million
Total Area I Costs	**$28 million**
Area II - 18 Street W. to 31 Street W.	
LRT Construction	$32 million
Associated Roadworks	$10 million
Land Acquisition	$ 5 million
Total Area II Costs	**$47 million**
Area III - 31 Street W. to 41 Street W.*	
LRT Construction	$35 million
Associated Roadworks	$ 2 million
Land Acquisition	$24 million
Total Area III Costs	**$61 million**
Area IV - 41 Street W. to 58 Street W.	
LRT Construction	$22 million
Associated Roadworks	$ 3 million
Land Acquisition	$ 6 million
Total Area IV Costs	**$31 million**

* Costs are representative of an underground alignment through the Westbrook Mall (Alternative III-a).

Area V - 58 Street W. to 69 Street W.	
LRT Construction	$11 million
Associated Roadworks	$ 0 million
Land Acquisition	$ 0 million
Total Area V Costs	**$11 million**
Total LRT Construction, Associated Roadworks and Land Acquisition Costs	**$178 million**
24 Light Rail Vehicles	**$31 million**
Total West LRT	**$209 million**

5.2 Summary of Costs

LRT Construction	$110 million
Associated Roadworks	$16 million
Land Acquisition	$52 million
24 Light Rail Vehicles	$31 million
Total West LRT	**$209 million (1983 $)**

Notes:

1. Associated roadworks include the realignment of 7 Avenue S. from 10 Street W. to 11 Street W., modifications to the Bow Trail/Crowchild Trail interchange, widening of Bow Trail from 33 Street W. to Crowchild Trail, widening of 17 Avenue S. from Sarcee Trail to east of 37 Street W.

2. Associated roadworks exclude the Bow Trail Connectors, the 17 Avenue S./Sarcee Trail interchange, and 17 Avenue S. from Sarcee Trail to 69 Street W.

3. Land acquisition costs exclude residual land value.