STAFF REPORT

CONSIDERATION OF RESOLUTION NO. 95-2243 FOR THE PURPOSE OF STUDYING THE SOUTH/NORTH DOWNTOWN PORTLAND ALIGNMENT OPTIONS AND AN AMENDED NORTH TERMINUS OPTION IN THE DEIS, CONCURRING WITH THE SOUTH/NORTH STEERING GROUP'S SELECTION OF DESIGN OPTIONS, AND ADOPTING THE MAJOR INVESTMENT STUDY FINAL REPORT

Date: November 30, 1995 Presented by: Richard Brandman

PROPOSED ACTION

Adoption of this resolution would:

1. Determine the alignment alternative and design options within downtown Portland that will be studied further within the Draft Environmental Impact Statement (DEIS);

2. State Metro Council's concurrence with the design options selected by the South/North Steering Group for further study within the DEIS;

3. Determine, consistent with an action previously taken by the C-TRAN Board of Directors, that the Phase One terminus for study within the DEIS will be in the vicinity of the Veterans Administration Hospital and Clark College until the Clark County Transportation Futures process concludes; and

4. Adopt the *Major Investment Study Final Report* documenting the South/North Tier I process, reports and conclusions, which included the locally preferred design concept and scope for the South/North Corridor.

TPAC has reviewed the proposed South/North LRT options and accompanying reports and recommends approval of Resolution No. 95-2243.

BACKGROUND

Resolution No. 95-2243 would address four issues related to the South/North Transit Corridor Project: 1) Downtown Portland alignments; 2) Design option narrowing; 3) The northern Phase One terminus for study in the DEIS; and 4) The *Major Investment Study Final Report*. Following is a discussion of each of those issues as they relate to the proposed resolution.

Downtown Portland Alignments

During the South/North Preliminary Alternatives Analysis, the Scoping Process and Tier I, a wide range of alternatives within downtown Portland was evaluated and screened from

further study. That screening process reached a major milestone in December 1994, when the Metro Council and the C-TRAN Board of Directors adopted Resolution No. 94-1989 and Resolution No. BR-94-011, respectively, and the *Tier I Final Report*. Within the *Final Report*, the Metro Council and the C-TRAN Board selected a surface light rail alignment on 5th and 6th Avenues (the Transit Mall) as the alternative alignment within downtown Portland to advance into the DEIS for further study. The Tier I narrowing process also concluded that a subway alternative should be removed from further consideration.

In selecting the surface light rail alignment on 5th and 6th Avenues, Metro Council identified a list of conditions placed upon its action. In summary, it was determined that prior to initiating work on the DEIS, a six-month detailed study of the 5th/6th surface alternative be conducted to ensure that the selected alternative could adequately address various principles, most importantly, that light rail, buses, pedestrians and automobiles could be accommodated on the Transit Mall and that the economic vitality of downtown Portland would be preserved and enhanced. To ensure that a broad base of interests would be addressed in the study, the principles also stated that the downtown alignment study would be performed in close coordination with the downtown Portland community.

In January 1995, the South/North Steering Group initiated the Downtown Portland Alignment Study by appointing the Downtown Portland Oversight Committee. The Oversight Committee was made up of downtown property and business owners and downtown residents. A full listing of the committees' memberships can be found in Exhibit B.

Through the six-month study, the Downtown Oversight Committee adopted criteria and measures, identified design options, developed and evaluated a wide range of technical information on those options, participated in a field trip on the Mall during the peak evening rush hour and conducted a variety of public involvement activities. Details of the study process and results can be found in Exhibit B.

On June 29, 1995, following this extensive and detailed analysis, the Downtown Portland Oversight Committee unanimously adopted its recommendation that the surface light rail alternative on 5th and 6th Avenues be studied within the DEIS and that no other surface street or subway alternatives be studied further. The Committee also recommended specific design options for each segment of downtown Portland that should be studied in greater detail within the DEIS. A detailed description of those recommended options can be found in Exhibit B.

The Committee based its recommendation on the recognition that the Downtown Portland Plan has been implemented through over 20 years of public and private investments in downtown Portland. Those investments have created a high density spine of development along 5th and 6th Avenues that is designed to be served by the Transit Mall. The Committee also noted strong concern about potential construction impacts. The Committee proposed a wide range of construction management and mitigation techniques that should be considered for inclusion within the South/North construction plan for downtown Portland.

Following the Oversight Committee, the South/North Project Management Group, the Citizens Advisory Committee and the Steering Group unanimously endorsed the Oversight Committee's recommendations. Recommendations from the Tri-Met Board of Directors and the City of Portland are scheduled to be adopted prior to consideration of this resolution by Metro Council.

Design Option Narrowing

The purpose of the design option narrowing process is to define in a higher level of detail the alignment options to be studied further within the DEIS. The corridor has been divided into eleven segments, with two to nine alignment design options in each segment. Data on the design options has been developed that addresses the various criteria and measures for design option narrowing, adopted by the South/North Steering Group in the *Tier I Evaluation Methodology Report* (Metro: December 1993). The methods and data are documented in the *Design Option Narrowing Technical Summary Report* and the *Design Option Narrowing Briefing Document.* The draft *Technical Summary Report* was reviewed by the Expert Review Panel in June 1995. The Panel found that the methods and data are appropriate and adequate for making the narrowing choices within this phase of the project. A listing of the design options considered and a summary of the data on each of the options is included within Exhibit A.

A 45-day public comment period was offered between June 1 and July 15, 1995, which included meetings conducted by the South/North Steering Group to receive public comment. In addition, public comments were received over the Metro Hotline, through the mail, at each of the CAC meetings and through a variety of community meetings held throughout the Corridor. Documentation of comments received concerning design option narrowing can be found in the *Design Option Narrowing Public Comment Report* (Metro: October 1995).

In September 1995, following review of the technical information and public comment, the PMG adopted the *Design Option Narrowing Final Recommendation Report* which identified the design options within each segment proposed by the PMG to be studied further within the DEIS. The CAC considered the PMG recommendations and adopted its own independent recommendations in October 1995. The Steering Group considered both recommendations, public comment and the technical data and adopted the *Design Option Narrowing Final Report* which identifies the design options to advance into the DEIS for further study.

As indicated in the *Evaluation Methodology Report*, the Steering Group has the responsibility to determine which design options are to advance into the DEIS for further study. However, participating jurisdictions were afforded the opportunity to review and comment on those design options. Metro is one of several participating jurisdictions given the opportunity to review and comment on the *Design Option Narrowing Final Report* (Exhibit A). Approval of Resolution No. 95-2243 would voice Metro Council's concurrence with the set of design options selected by the Steering Group.

A detailed description of the options, the rationale for their selection and a listing of issues associated with the options are included within Exhibit A.

Northern Phase One Terminus

The *Tier I Final Report* identified the terminus options selected by Metro Council and the C-TRAN Board of Directors to be studied within the DEIS. It also noted that the South/North Corridor would be developed in two distinct phases. The Clackamas Town Center Area and the vicinity of 99th Avenue in Hazel Dell were selected as the southern and the northern termini for Phase One. The Phase Two termini were identified as Oregon City in the south and 134th Avenue in the north.

Subsequently, in August 1995, following an extensive public effort to initiate the Clark County Transportation Futures Process, the C-TRAN Board of Directors amended the Phase One terminus for study within the DEIS to be in the vicinity of the Veterans Administration Hospital and Clark College near I-5 just north of downtown Vancouver until the Transportation Futures Process concludes in 1996. The southern termini and the Phase Two northern terminus were unchanged.

MIS Final Report

The South/North Transit Corridor Study was initiated in April 1993 with the selection of the priority corridors by the Metro Council and the C-TRAN Board of Directors. In October 1993, the Federal Transit Administration (FTA) approved Metro's request to advance the Corridor into Alternatives Analysis and issued notification in the *Federal Register* of its intent to publish a South/North DEIS. Subsequently, in November 1993, FTA and FHWA issued the Metropolitan Planning Rule which established guidelines for the Major Investment Study (MIS) process which replaced the Alternatives Analysis process previously used for light rail planning purposes.

The new guidelines also provided for consultations between local and federal governments to determine how studies initiated under the Alternatives Analysis guidelines (*transitional projects*) should be modified to comply with the MIS requirements. A consultation for the South/North study was held in December 1994, where it was determined that the South/North Study would conclude by addressing the MIS requirements, documented within an *MIS Final Report.* The report would document alternatives previously studied within the Corridor and the locally preferred design concept and scope selected by the study to be included within the Regional Transportation Plan.

The locally preferred design concept and scope was adopted through the Tier I process of Scoping and narrowing of alignment and terminus alternatives. The federally mandated financially constrained Regional Transportation Plan, which includes the locally preferred design concept and scope for the South/North Corridor, was adopted by Metro Council in May 1995.

Resolution No 95-2243 would adopt the *MIS Final Report* (Exhibit C) which documents the Tier I process leading to the selection of the locally preferred design concept and scope for the South/North Corridor, and subsequently included in the Regional Transportation Plan.

BEFORE THE METRO COUNCIL

FOR THE PURPOSE OF STUDYING THE SOUTH/NORTH DOWNTOWN PORTLAND ALIGNMENT OPTIONS AND AN AMENDED NORTH TERMINUS OPTION IN THE DEIS, CONCURRING WITH THE SOUTH/NORTH STEERING GROUP'S SELECTION OF DESIGN OPTIONS, AND ADOPTING THE MAJOR INVESTMENT STUDY FINAL REPORT	) RESOLUTION NO. 95-2243)) Introduced by:) Councilor Monroe))))

WHEREAS, In April 1993, the Metro Council adopted Resolution No. 93-1784 and the C-TRAN Board of Directors adopted Resolution No. BR-93-9404 which selected the Milwaukie and I-5 North Corridors as the region's next high-capacity transit priority for study and combined them into the South/North Transit Corridor to be studied within a federal Draft Environmental Impact Statement; and

WHEREAS, In October 1993, the Federal Transit Administration approved the South/North application to initiate Alternatives Analysis/Draft Environmental Impact Statement and the South/North Preliminary Work Plan, and issued notification of intent in the *Federal Register* to publish a South/North Environmental Impact Statement; and

WHEREAS, In November 1993, the Federal Transit Administration and the Federal Highway Administration jointly issued the Metropolitan Planning Rule which included the Major Investment Study guidelines to replace the Alternatives Analysis guidelines and provided for consultations to determine how projects that had been initiated prior to the new rules would comply under the Major Investment Study guidelines; and

WHEREAS, In December 1994, a Major Investment Study consultation was held between Metro, the Federal Transit Administration and the Federal Highway Administration

and it was determined that Tier I of the South/North Transit Corridor Study would conclude by addressing the Major Investment Study guidelines documented in a Major Investment Study Final Report; and

WHEREAS, The role of the Steering Group in the terminus and alignment alternative narrowing process is to forward its recommendations to participating jurisdictions for their consideration, that participating jurisdictions are to forward their recommendations to the C-TRAN Board of Directors and the Metro Council who are to make the final determination of the alternatives to advance into the Draft Environmental Impact Statement for further study; and

WHEREAS, The role of the South/North Steering Group in the design option narrowing process is to consider recommendations from the South/North Project Management Group and Citizen Advisory Committee and to select the design option(s) which will be studied further in the Draft Environmental Impact Statement; and

WHEREAS, In December 1994, the Metro Council adopted Resolution No. 94-1989 and the C-TRAN Board of Directors adopted Resolution No. BR-94-011 which identified the locally preferred design concept and scope for the corridor (light rail transit, the Phase One terminus alternatives and alignment alternatives) to advance into the Draft Environmental Impact Statement and Preliminary Engineering for further study; and

WHEREAS, In December 1994, within the same resolution, the Metro Council and the C-TRAN Board of Directors also determined that within the Portland central business district, a surface light rail transit alternative on 5th and 6th Avenues shall be developed based upon several principles and that if prior to initiation of the Draft Environmental Impact Statement it is concluded that a 5th/6th Avenue alignment cannot be developed that addresses

those principles, other alternatives will be developed for further study in the Draft Environmental Impact Statement; and

WHEREAS, In March 1995, the South/North Steering Group selected both the Caruthers and Ross Island Crossing alternatives and both the I-5 and Interstate Avenue alignment alternatives for further study in the Draft Environmental Impact Statement; and

WHEREAS, In May 1995, Metro Council adopted Resolution No. 95-2138A which approved the federally-required financially constrained Regional Transportation Plan which included the locally preferred design concept and scope for the South/North Corridor; and

WHEREAS, In August 1995, the C-TRAN Board of Directors adopted resolution No. 95-048 which amended the Phase One northern terminus for study in the Draft Environmental Impact Statement from the vicinity of 99th Avenue in Hazel Dell, Washington to the Veterans Administration Hospital/Clark College in Vancouver, Washington until the Clark County Transportation Futures Process concludes; and

WHEREAS, The alignment design options currently under study have been developed and evaluated based upon the criteria and measures from the *Evaluation Methodology Report* and documented within various technical memoranda, including the *South/North Design Option Narrowing Report* and the *Design Option Briefing Document*; and

WHEREAS, A comprehensive public involvement program for the design option narrowing process was developed and implemented by the South/North Study that included, but was not limited to, numerous community meetings, a 45-day public comment period, public meetings for the Steering Group to receive oral comment and an ongoing Citizens Advisory Committee that provided regular public comment opportunities; and

WHEREAS, Various options for a 5th/6th Avenue surface light rail alignment were evaluated by the Downtown Portland Oversight Committee which concluded that the recommended design option on 5th/6th Avenues adequately addresses the criteria established by Metro Council, the C-TRAN Board of Directors and the Oversight Committee and should therefore be exclusively studied further within the Draft Environmental Impact Statement; and

WHEREAS, In October and November 1995, the Project Management Group and the Citizens Advisory Committee formed independent recommendations for both design option narrowing and the downtown Portland alignment alternative and forwarded them to the Steering Group for consideration; and

WHEREAS, In November 1995, the Steering Group adopted the South/North *Design Option Narrowing Final Report* (Exhibit A) which identifies the design options that best meet the project's adopted goal and objectives and which will advance into the Draft Environmental Impact Statement for further study; and

WHEREAS, In November 1995, the Steering Group adopted the proposed light rail alignment design for 5th/6th Avenues in downtown Portland; now, therefore

BE IT RESOLVED:

1. That Exhibit B is hereby adopted as the *South/North Downtown Portland Tier I Final Report.*

2. That the Metro Council has concluded in this *Final Report* that the downtown Portland design options, A-2, B-3, C-1, N-1, N-2, and S-1 described in Exhibit B, would generally retain current automobile access and pedestrian facilities; would generally provide for a lane of joint bus and light rail operations and a lane of exclusive bus operations on

5th/6th Avenues; adequately addresses the criteria established by Resolution No. 94-1989 as adopted by the Metro Council and the C-TRAN Board of Directors; and shall therefore be exclusively studied further within the Draft Environmental Impact Statement.

3. That the Metro Council concurs with the design options selected by the South/North Steering Group for further study within the Draft Environmental Impact Statement as described in the *Design Option Narrowing Final Report* (Exhibit A) which are generally as follows:

a. *Minimum Operable Segments.* (1) a full-length project from the vicinity of the Clackamas Regional Center, through downtown Milwaukie, Portland and Vancouver, to the vicinity of the Veterans Administration Hospital/Clark College; (2) a bi-state minimum operable segment from the vicinity of downtown Milwaukie/Market Place station and park-and-ride lot to the vicinity of the Veterans Administration Hospital/Clark College; and (3) three Oregon-only minimum operable segments each with a southern terminus in the vicinity of the Clackamas Regional Center and a northern terminus at: a) the vicinity of the Rose Quarter; b) the vicinity of the Edgar Kaiser Medical Center; or c) the vicinity of the Expo Center.

b. *South Terminus.* North of Clackamas Town Center alignment with a Sunnyside Park-and-Ride Terminus east of I-205; and South of Clackamas Town Center alignment with a 93rd Avenue Town Center Area Terminus.

c. *Railroad Avenue/Highway 224.* Alignment adjacent to Railroad Avenue.

d. *Downtown Milwaukie.* McLoughlin Boulevard/Main Street with a Monroe Street Alignment; and Southern Pacific Branch Line with a Monroe Street alignment.

e. *Ross Island Crossing.* North Ross Island Crossing alignment with a West of McLoughlin Boulevard sub-option.

f. *Caruthers Crossing and Southeast Portland.* Caruthers Modified with a West of Brooklyn Yards alignment.

g. *Steel Bridge to Kaiser.* East I-5/Kerby Avenue alignment; and Wheeler Avenue/Russell Avenue alignment.

h. *North Portland.* All-I-5 alignment; and All-Interstate Avenue (Metro work with Tri-Met and City staff to evaluate as soon as the technical data for the DEIS is available which North Portland crossover option warrants further study; and staff will report back to the South/North Project Management Group, Citizen Advisory Committee and Steering Group).

i. *Hayden Island.* West of I-5 (under ramps).

j. *Columbia River Crossing.* Low-level lift span.

k. *Downtown Vancouver.* Two-way on Washington Street.

4. That, consistent with an action taken by the C-TRAN Board of Directors in August 1995, the South/North Phase One northern terminus to be studied within the Draft Environmental Impact Statement is amended to be in the vicinity of the Veterans Administration Hospital and Clark College in Vancouver, Washington.

5. That Metro Council adopts the *Major Investment Study Final Report* (Exhibit C) documenting the South/North Tier I process, reports and conclusions which selected the

locally preferred design concept and scope for the South/North Corridor and led to its inclusion within the Regional Transportation Plan addressing the federal Metropolitan Planning Rule and Major Investment Study guidelines.

ADOPTED by the Metro Council this _____ day of _____, 1995.

_____
J. Ruth McFarland, Presiding Officer

Approved as to Form:

_____
Daniel B. Cooper, General Counsel

LS:lmk
95-2243.RES
12-1-95

EXHIBITS A, B AND C ARE AVAILABLE FROM THE TRANSPORTATION DEPARTMENT UPON REQUEST. PLEASE CONTACT JAN FARACA AT 797-1787 TO OBTAIN A COPY.

EXHIBIT A

South North
Transit Corridor Study

Design Option Narrowing Final Report

South/North Steering Group

November 20, 1995

METRO

Design Option Narrowing Final Report

South/North Transit Corridor Study

South/North Steering Group

November 20, 1995

Metro

The preparation of this report was financed in part by the U.S. Department of Transportation, Federal Transit Administration, Oregon Department of Transportation and Washington Department of Transportation. The opinions, findings and conclusions expressed in this report are not necessarily those of either the U.S. Department of Transportation, Federal Transit Administration, Oregon Department of Transportation and Washington Department of Transportation

TABLE OF CONTENTS

1. Introduction

1.1	Purpose of the Report	1
1.2	Study, Public Involvement and Decision-Making Process	2
1.3	Organization of the Report	3

2. Minimum Operable Segments/Terminus Options

2.1	Background	5
2.2	Selected MOS's	6
2.3	MOS Issues	6

3. Design Options

3.1	Clackamas Town Center Vicinity	7
3.2	CTC to Milwaukie	12
3.3	Milwaukie	15
3.4	Milwaukie to Portland CBD	19
3.5	Portland CBD	23
3.6	Steel Bridge to Kaiser Medical Facility Vicinity	24
3.7	Kaiser Medical Facility Vicinity to Expo Center Vicinity	27
3.8	Expo Center Vicinity to V.A. Hospital/Clark College Vicinity	31

Appendix A: Design Options Considered
Appendix B: Design Option Narrowing Process
Appendix C: Design Option Narrowing Criteria and Measures

1.0 Introduction

1.1 PURPOSE OF THE REPORT

This report documents the light rail transit options selected by the South/North Steering Group to be studied further in the Draft Environmental Impact Statement (DEIS).

It is important to understand the context of this report. Earlier in Tier I, during the *Scoping Process*, it was determined that the DEIS will address two transportation alternatives for the South/North Corridor: (i) the No-Build Alternative; and, (ii) the Light Rail Transit (LRT) Alternative. Further, in December 1994, with the adoption of the *Tier I Final Report* (Metro: December 1994), Metro Council and the C-TRAN Board of Directors adopted the Phase One Termini and most of the Corridor's alignment alternatives to advance into the Tier II DEIS for further study. Later in the spring of 1995, the alignment alternatives in the remaining segments of the corridor (the south Willamette River crossings and the North Portland alignments) were narrowed. Then finally, in August 1995, following an extensive effort to involve the public in the creation of the Clark County and City of Vancouver Transportation Futures process, C-TRAN amended the northern Phase I terminus (from 99th Street to Veterans Administration (VA) Hospital/Clark College).

This report establishes the:

[a] LRT alignment design options;

[b] general location of potential light rail stations, transit centers and park-and-ride lots on each of the proposed alignment options; and

[c] "Minimum Operable Segments (MOS)";

which will be addressed in the Draft Environmental Impact Statement.

This report also includes listings of *Issues* regarding the identified options. Many of these *Issues* identify major areas for further study that may occur between the time this report is approved and the time DEIS analysis begins. These activities may result in refinements to the recommended alignment, station location and MOS options. Refinements may also occur during the DEIS and the FEIS. Thus, the options set forth in this report are a starting point, not a final proposal.

1.2 STUDY, PUBLIC INVOLVEMENT AND DECISION-MAKING PROCESS

Tier I of the South/North Corridor Transit Study began in April 1993. The bi-state study has included the work of 15 different governmental entities having some responsibility for the project, including: five cities, four counties, Tri-Met, C-TRAN, Metro, RTC, ODOT, WSDOT and the Port of Portland.

In December 1993, the South/North Steering Group adopted the *Tier I Evaluation Methodology Report* (Metro: December 1993). The *Methodology Report* includes the adopted Goal for the South/North Project: "To implement a major transit expansion program in the South/North Corridor that supports bi-state land use goals, optimizes the transportation system, is environmentally sensitive, reflects community values and is fiscally responsive." The report also adopted the criteria and measures and process to be used to narrow design options that will advance into the DEIS for further study. Appendix A includes a diagram of the Design Option Narrowing process and Appendix B includes a summary table of the Design Option Narrowing Criteria and Measures.

Over the past 12 months, project staff have been engaged in identifying, engineering, costing, projecting ridership and assessing the impacts of alignment design options identified at the beginning of or during Tier I. The results of that work are documented in the *South/North Design Option Narrowing Briefing Document* and the *South/North Design Option Narrowing Technical Summary Report* (Metro: October 1995).

In addition, there has been a myriad of public forums and hearings, Citizen Advisory Committee meetings, Expert Review Panel meetings and technical meetings concerning design options. Hundreds of public comments have been received, catalogued and distributed to project staff and policy-makers. Those public comments are included within the *South/North Design Option Narrowing Public Comments Report* (Metro: September 1995).

The design options identified in this report for further study within the DEIS are based on the results of these technical and public involvement activities, as well as the consideration of recommendations independently proposed by the South/North Citizens Advisory Committee and the South/North Project Management Group.

The *Design Option Narrowing Final Report*, as adopted by the Steering Group, will be distributed to the governing body of each of the participating governmental entities. Tier I will conclude when the Steering Group and participating jurisdictions reach a consensus on the design options to advance into the DEIS for further study. Subsequently, the preparation of the DEIS will begin and the process of evaluating and refining the options will continue to occur, this time at a more detailed level of analysis.

1.3 ORGANIZATION OF THE REPORT

Chapter Two of this report defines the two termini for the full length light rail alternative and four potential minimum operable segments. It also identifies the major issues regarding the *MOS's* which still need resolution.

Chapter Three defines one or two alignment options for each of eight segments encompassing the full-length light rail alignment. Potential station locations and major outstanding issues are also identified in each segment.

2.0 Minimum Operable Segments/Terminus Options

2.1 BACKGROUND

The full-length light rail alternative to be examined in the DEIS would run between the vicinity of the Clackamas Town Center in Oregon and the vicinity of the Veterans Administration (VA) Hospital/Clark College in Vancouver, Washington. This alternative is premised on the assumption that:

[a] the Clark County transportation futures study incorporates a continued interest to examine bi-state light rail options; and

[b] 50% federal funding for such an option would be secured over two federal authorization cycles requiring the full-length project to be built in two construction segments.

FTA requires that all DEISs include an examination of Minimum Operable Segments (MOS's) for each light rail alternative. MOS's are light rail alignments which are:

[a] segments of the full length alternative;

[b] can be operated successfully on an interim or long-term basis; and

[c] can be extended into the full-length alternative at a later time.

FTA requires MOS's to be studied to:

[a] assess whether project objectives can be equally or more cost-effectively met by *MOS's* than the more expensive full-length alternatives;

[b] ensure that there are alternatives which could be constructed if funding sources provide less revenues than initially expected or desired; and

[c] ensure that there are options which could be built in sequence, over time, if cash flow requirements dictate phased-construction.

In addition, the MOS's provide the opportunity to examine different permanent termini in North Portland if the Clark County transportation futures process determines that light rail is not an appropriate mode in Clark County at this time.

2.2 SELECTED MOS's

These conditions lead to defining a series of MOS's which include:

[a] One MOS providing a bi-state segment:

1. **Milwaukie CBD/Marketplace Park-and-Ride to V.A. Hospital/Clark College (Vancouver)**

[b] Three Oregon-only MOS's providing various length extensions into N/NE Portland:

2. **Clackamas Town Center Vicinity to Rose Quarter Vicinity**

3. **Clackamas Town Center Vicinity to Kaiser Clinic Vicinity**

4. **Clackamas Town Center Vicinity to Expo Center Vicinity**

2.3 MOS ISSUES

Four issues regarding MOS's require continued investigation at this time:

1. *Design of MOS termini:* The location and design of the three MOS termini in North Portland (Rose Quarter, Kaiser Clinic and Expo Center), including the station and trackage, need to be refined over the next two months.

2. *Bus service:* The bus configuration serving the North Portland MOS termini (in the CTC to North Portland MOS's) and the Milwaukie terminus (in the Milwaukie to Vancouver MOS) also need to be defined over the next two months.

3. *Park-and-ride configurations:* The configuration of the Expo Center park-and-ride (in the CTC to Expo Center MOS) and the Milwaukie park-and-ride (in the Milwaukie to Vancouver MOS) need to be refined over the next two months.

4. *MOS funding plans:* As part of the DEIS, a funding plan will be prepared for each of the MOS options.

3.0 Design Options

3.1 CLACKAMAS TOWN CENTER VICINITY

3.1.1 Clackamas Town Center Vicinity: Recommended Options (See Figures 1 & 2)

In this segment, two design options will be examined in the DEIS:

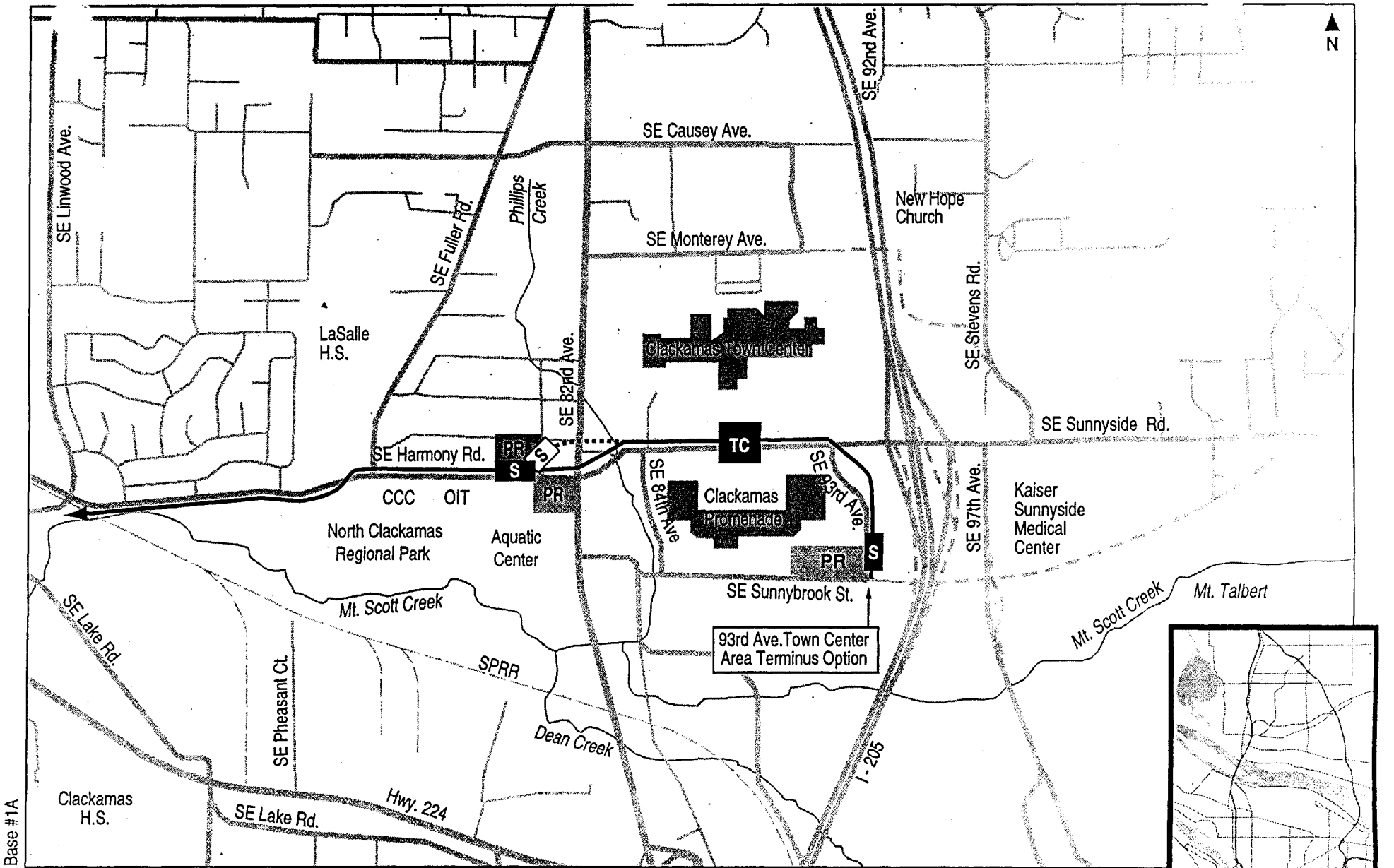
1. *North of Clackamas Town Center Alignment to Sunnyside Area Terminus*: From the S.E. Fuller Road/S.E. Harmony Road vicinity, the alignment would run along the west and north circumference of the Southgate community. It would then cross S.E. 82nd Avenue on an elevated structure and head eastward in the vicinity of S.E. Monterey Avenue to a transit center serving the CTC. From there, the alignment would continue eastward, crossing I-205 on a new structure, to a park-and-ride near the New Hope Church. From the Church, the alignment would run southward, paralleling I-205, crossing S.E. Sunnyside Road and then proceeding eastward to a park-and-ride terminus station.

2. *South of Clackamas Town Center Alignment to S.E. 93rd Avenue Town Center Area Terminus:* From the S.E. Fuller Road/S.E. Harmony Road vicinity, the alignment would run eastward along S.E. Harmony Road, to a park-and-ride station just west of S.E. 82nd Avenue. This station would also serve walk-ons from the Southgate community, Aquatic Center and Oregon Institute of Technology. The alignment would then curve slightly northwards to a point near the northern border of S.E. Sunnyside Road, cross S.E. 82nd Avenue and head eastward to a transit center south of the Clackamas Town Center. Bus improvements providing access to the transit center would also be included. The LRT alignment would extend east and cross Sunnyside Road above grade and extend south, parallel to and east of I-205, to a terminus station and park-and-ride lot in the vicinity of 93rd Avenue and Sunny Brook Street.

3.1.2 Clackamas Town Center Vicinity: Issues

Several issues require continued investigation in this area. As explained earlier, the Town Center area is recommended as the southern terminus of the South/North LRT Project for two primary reasons: (i) the general Town Center area is proposed to be a Regional Center in the Region 2040 Plan and (ii) the Town Center mall itself is a high-transit-ridership node. The Town Center area terminus works best if these opportunities are realized and its success depends on the integration of the LRT alignment with an on-the-ground transit-supportive land use pattern and related (re)development site plans. Six issues need to be resolved which, depending on how they are resolved, may result in changes to the design options in the CTC vicinity:

1. *Southgate community redevelopment*: As part of its urban renewal planning effort, Clackamas County should determine if and how light rail fits into the redevelopment of the Southgate residential area. The current design calls for an LRT alignment which skirts the



South North Transit Corridor Study

Light Rail Design Options:

South Terminus

Composite

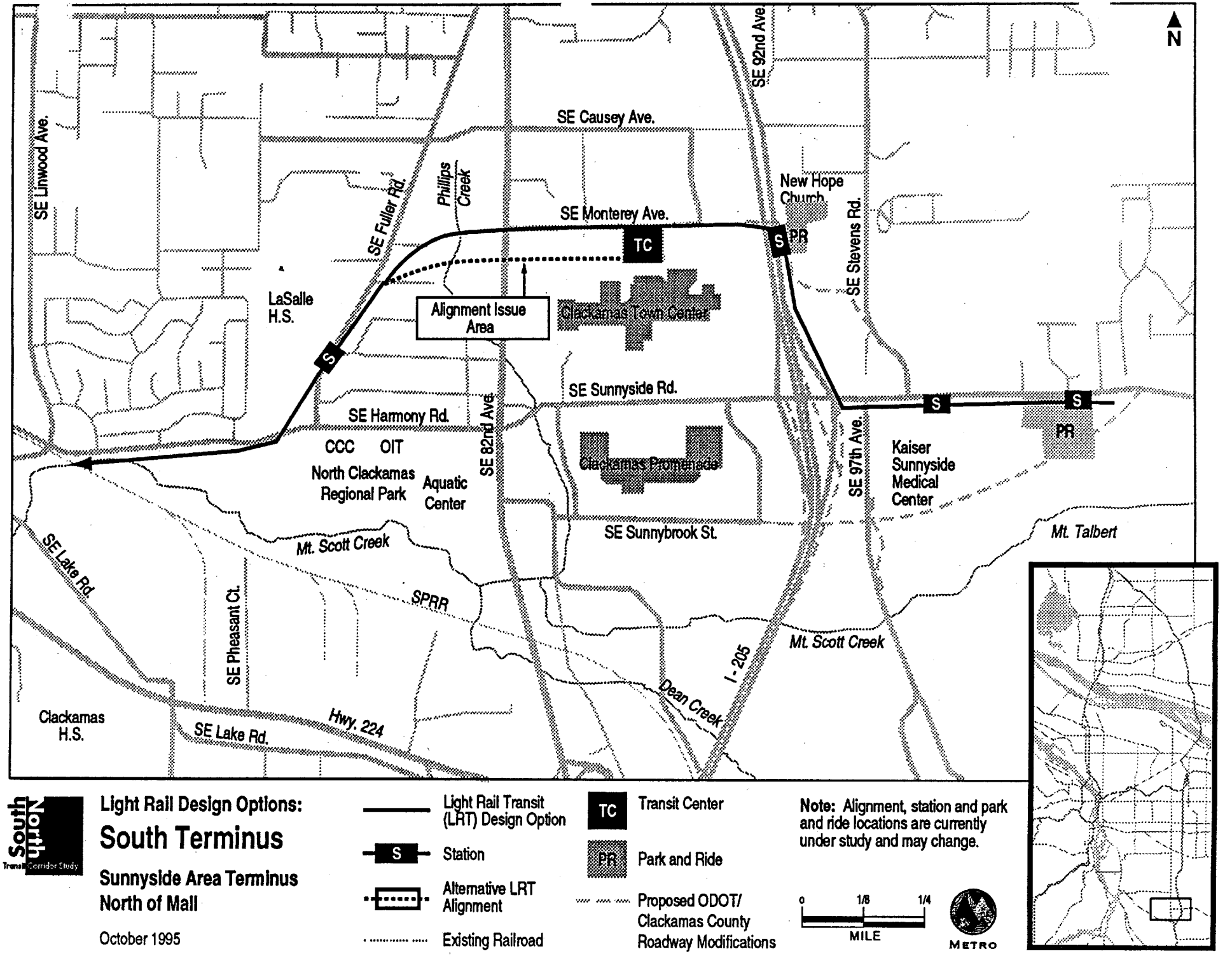
October 1995

- Light Rail Transit (LRT) Design Option
- S — Station
- Alternative LRT Alignment
- Existing Railroad
- TC — Transit Center
- PR — Park and Ride
- Proposed ODOT/ Clackamas County Roadway Modifications

Note: Alignment, station and park and ride locations are currently under study and may change.

0 1/8 1/4 MILE

METRO



South North Transit Corridor Study

Light Rail Design Options:

South Terminus

Sunnyside Area Terminus North of Mall

October 1995

- Light Rail Transit (LRT) Design Option
- S — Station
- Alternative LRT Alignment
- Existing Railroad
- TC — Transit Center
- PR — Park and Ride
- Proposed ODOT/ Clackamas County Roadway Modifications

Note: Alignment, station and park and ride locations are currently under study and may change.

0 1/8 1/4 MILE

METRO

Figure 2

residential area. If Clackamas County recommends the adoption of a redevelopment plan for the Southgate area which (i) increases residential or mixed-use densities in the area and (ii) calls for a modified LRT alignment through the Southgate area which does not require an inordinate increase in residential displacement, the Steering Group will consider adding such an alignment option to the EIS[1]. The Steering Group's action will be viewed in concert with the resolution of the other issues listed in this sub-section.

2. *Future development of the Clackamas Town Center*: The North of Town Center alignment recommended to be included in the DEIS would run along the northern edge of the Town Center parking area parallel to S.E. Monterey Avenue. This alignment is predicated on the expansion of the Town Center northerly towards the proposed LRT station, either by expanding the Mall and/or developing transit-supportive, free-standing buildings on perimeter sites. If plans for such an expansion are not agreed-upon prior to the completion of the DEIS or are not likely to be realized in the foreseeable future, an alignment slightly south of S.E. Monterey Avenue, closer to the existing Mall, will be considered for inclusion in the EIS[1] in lieu of or addition to the current alignment.

   A similar course-of-action will be taken for the South of Town Center alignment. The expansion plans for the Clackamas Town Center mall currently call for the addition of an anchor store at the southern end of the mall between Sears and Meier & Frank. The entrance to this planned expansion could be in the vicinity of the proposed light rail station associated with the South of the Mall alignment. If plans for the mall expansion are not agreed-upon in the foreseeable future, an alignment closer to an entrance to the existing Mall will be considered for inclusion in the EIS[1].

3. *Redevelopment of the area between the New Hope Church and the Sunnyside Medical Center*: The current alignment in this area would run parallel to and in the vicinity of I-205. An area just to the east of the proposed alignment is currently designated as open space. If Clackamas County (i) recommends that a significant portion of this area be redesignated as a transit-supportive residential or mixed-use area and (ii) calls for a modified LRT alignment through the area, the Steering Group will consider adding such an alignment option to the EIS[1]. The Steering Group's action will be viewed in concert with the resolution of the other issues listed in this sub-section.

4. *Extension/expansion of the urban renewal district:* Clackamas County has begun to evaluate whether the existing Clackamas Town Center Urban Renewal Area (CTC URA) should be extended in time (it is now slated to terminate June 30, 1998) and expanded in geographic area (an expansion of approximately 100 acres is statutorily permitted). In order to resolve these issues, the Steering Group recommends that Clackamas County consider amending the CTC urban renewal plan to provide redevelopment and light rail-related design features to achieve the purposes of the 2040 Plan and the South/North Project.

---

[1] The term "EIS" is used here to denote either the DEIS or FEIS, whichever is found most appropriate.

5. *Tax increment financing of localized alignment and design features in the Town Center area*: The recommended North of Town Center alignment/Sunnyside Terminus option is currently estimated to cost $55 million more than the recommended South of Town Center alignment/S.E. 93rd Avenue Town Center Area terminus option. As studies proceed on the issues mentioned above, the cost of both alignment options may change, as might the cost differential between the options. Given (i) the cost differences between the CTC options and (ii) the shared objectives between the South/North Project and an amended urban renewal plan (if one is adopted), the Steering Group recommends that Clackamas County consider the use of tax increment funds from the amended plan and/or other local funding sources for a portion of the light rail costs in this area.

6. *Future light rail alignment to Oregon City*: Pursuant to the Tier I decision, an effort parallel to the DEIS process will consider alternative ways to extend the South/North LRT to Oregon City in a Phase II project. Two basic alignment options will be considered: the McLoughlin Boulevard corridor from downtown Milwaukie and the I-205 corridor from the CTC vicinity. This study may result in refinements/ modifications to the light rail alignments, station locations and terminus sites/designs in the CTC vicinity which are incorporated in the EIS[1].

7. *Location of the 82nd Avenue and Harmony Road park-and-ride with the "South of Clackamas Town Center" option and design of the alignment, stations, transit center and terminus park-and-ride lot east of 82nd Avenue:* The precise location of the alignment, station and park-and-ride lot just west of S.E. 82nd Avenue on/near S.E. Harmony Road needs to be refined over the next two months. Options to be considered include locations on both the north and south sides of S.E. Harmony Road. The precise location of the alignment, stations, transit center and terminus park-and-ride lot east of 82nd Avenue needs to be refined over the next two months.

3.1.3 Clackamas Town Center Vicinity: Rationale

Because, the "South of the Mall" design options are shorter, they are less expensive to build and operate and faster for through-travel than the "North of the Mall" design options. However, the "North of the Mall" options may better serve land use objectives by assisting in the redevelopment of Southgate area, serving the existing multi-family residential areas to the north of the mall and (as discussed in the *Issues* section) the potentially rezoned lands just east of I-205.

The recommended design options in the Clackamas Town Center (CTC) segment are proposed to frame the fundamental issue in this segment: are the land use benefits of the "North of the Mall" and "east of I-205 terminus" options worth their greater costs and longer travel times? To best assess this issue in the DEIS, the best "North of the Mall" option should be compared against the best "South of the Mall" option.

The S.E. 93rd Avenue Town Center Area Terminus is the selected "South of the Mall" option because:

[a] It would be $34 and $124 million ($YOE) less expensive than the "South of the Mall" options that connect to the Sunnyside Terminus or the Highway 212/224 Terminus options.

[b] It would provide an additional park-and-ride lot opportunity for the south of CTC alignment over the 84th Avenue CTC terminus option.

[c] It would be capable of being extended south at a future date, if so desired.

The Sunnyside Terminus is the selected "North of the Mall" option because:

[a] It would serve the major growth area along S.E. Sunnyside Road east of I-205, where the other options would not.

[b] Its number of light rail boardings in the CTC segment would be 64% - 89% greater than the other "North of the Mall" options.

[c] It would be $106 million ($YOE) less expensive to construct, $180,000 per year less expensive to operate and faster to operate than the Highway 212/224 Terminus option.

[d] It would be capable of being extended to the south at a future date, if so desired.

3.2 CTC TO MILWAUKIE

3.2.1 CTC to Milwaukie: Selected Options (See Figure 3)

In this segment, one design option is selected to be examined further in the DEIS:

1. *Railroad Avenue:* From the south side of S.E. Harmony Road, the light rail alignment would cross under S.E. Harmony Road east of its intersection with S.E. Linwood and S.E. Railroad Avenues. A potential park-and-ride station would be located at S.E. Harmony Road/S.E. Linwood Avenue. The alignment would proceed westward on the south side of S.E. Railroad Avenue in the public right-of-way adjacent to the Southern Pacific main line. Railroad Avenue would be reconstructed to accommodate the light rail alignment. A station could be located near S.E. Home Avenue to serve the residential area to the north and the industrial area to the south. The alignment would continue adjacent to the SP main line until crossing over the main line in the vicinity of S.E. Oak and S.E. Myrtle

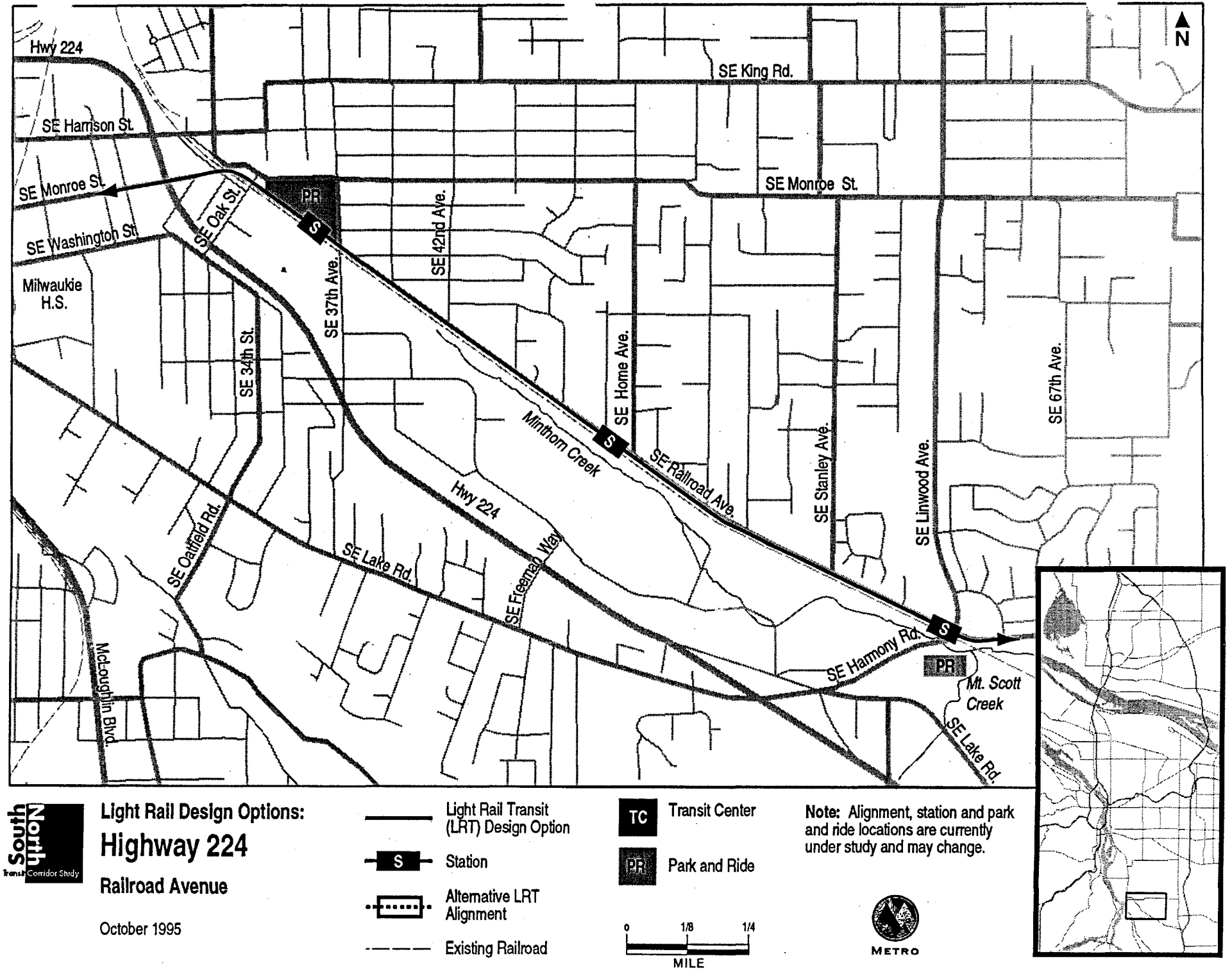

Hwy 224
SE King Rd.
SE Harrison St.
SE Monroe St.
SE Monroe St.
SE Washington St.
SE Oak St.
PR
S
SE 42nd Ave.
SE 37th Ave.
Milwaukie H.S.
SE 34th St.
SE Home Ave.
SE 67th Ave.
Minthorn Creek
S
SE Railroad Ave.
SE Stanley Ave.
SE Linwood Ave.
Hwy 224
SE Oatfield Rd.
SE Lake Rd.
SE Freeman Way
McLoughlin Blvd.
S
SE Harmony Rd.
PR
Mt. Scott Creek
SE Lake Rd.
N
Light Rail Design Options:
Highway 224
Railroad Avenue
October 1995
South North Transit Corridor Study
Light Rail Transit (LRT) Design Option
S Station
Alternative LRT Alignment
Existing Railroad
TC Transit Center
PR Park and Ride
0 1/8 1/4
MILE
Note: Alignment, station and park and ride locations are currently under study and may change.
METRO

Figure 3

Streets, just west of the Milwaukie Market Place. A station would serve the area and a potential park-and-ride lot. The structure would overpass Highway 224, landing on S.E. Monroe Street.

3.2.2 CTC to Milwaukie: Issues

Three issues require continued investigation in this area:

1. *Design of Railroad Avenue Collector:* The initial design of the Railroad Avenue option required substantial residential displacement and, as a result, relatively high capital cost due to the relocation and reconstruction of Railroad Avenue. A modified option providing for a Railroad Avenue reconstructed as a "collector" is now proposed. This modification would reduce the possible displacement impacts and capital costs of the option. As the EIS is prepared, project staff will investigate the possibility of using Southern Pacific right-of-way as a method to further reduce possible displacements and costs.

2. *Access to industrial area*: Railroad Avenue parallels the north side of major employment centers along Highway 224. Special consideration will be given to the alignment, station locations and access ways in this segment to ensure that light rail is accessible is to these centers.

3. *Location and design of station in the vicinity of S.E. Railroad Avenue and S.E. Oak Street:* The design and location of the Milwaukie Market Place station will be refined over the next two months to improve its auto access, neighborhood access and cost.

3.2.3 CTC to Milwaukie: Rationale

The S.E. Railroad Avenue option is the selected option in the CTC to Milwaukie segment for inclusion in the DEIS because:

[a] It would be $8 to $23 million ($YOE) less expensive to construct than the Highway 224 options.

[b] It would be slightly faster (8 - 19 seconds) to operate and would attract slightly more light rail boardings (30 - 60 per day) in the CTC to Milwaukie segment than the Highway 224 options.

[c] Its comparative ratio would be 13% to 32% better than the Highway 224 options.

[d] It would allow for a park-and-ride facility east of the Milwaukie CBD (in the vicinity of S.E. Railroad Avenue and S.E. Oak Street) which would serve the travel shed for the residential area north of S.E. Railroad Avenue. The station also would provide walk-on access to portions of the residential area north of S.E. Railroad Avenue.

3.3 MILWAUKIE

3.3.1 Milwaukie: Selected Options (See Figure 4)

In this segment, two design options are selected to be examined in the DEIS:

1. *S.E. Monroe Street to East of the Southern Pacific Tillamook Branch Line:* From the Highway 224 overcrossing, the alignment would proceed westerly on S.E. Monroe Street. S.E. Monroe Street would be configured to operate two tracks of light rail and one westbound traffic lane between S.E. 25th and S.E. 9th Streets.

   The alignment would curve northerly in the vicinity of S.E. 25th Street to a transit center just east of the S.P. branch line between S.E. Monroe and S.E. Harrison Streets. The alignment would then proceed adjacent to the east side of the S.P. Branch line, through an existing underpass of Highway 224 and on structure over to the westside of the branch line, to a potential park-and-ride station at S.E. Ochoco Street. The alignment would then continue northerly along the branch line to about S.E. Umatilla Street where it would veer towards S.E. McLoughlin Boulevard as it continues northerly.

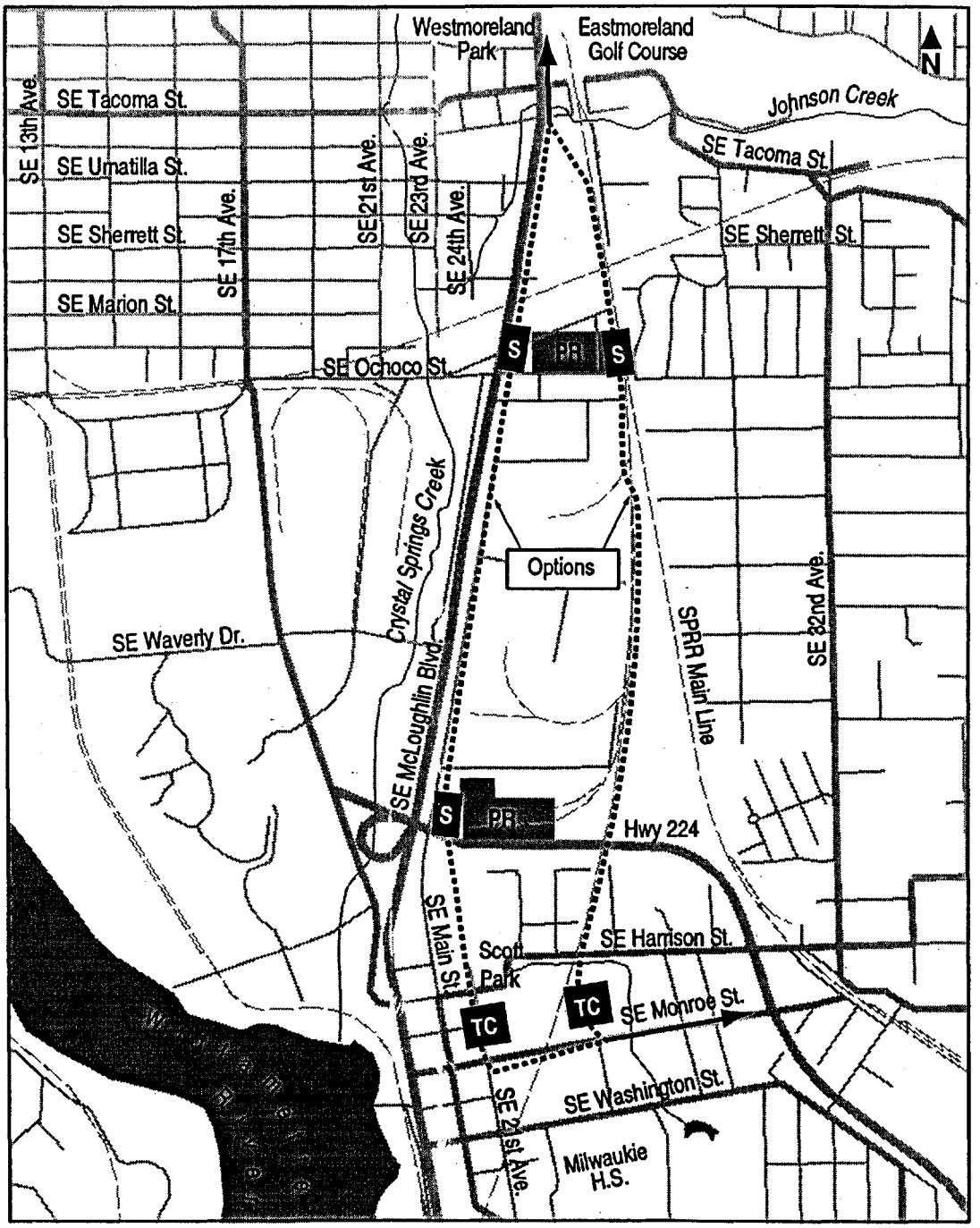
2. *S.E. Monroe to S.E. 21st Avenue/S.E. McLoughlin Boulevard:* From the overcrossing of Highway 224, the alignment would proceed westerly on S.E. Monroe Street. S.E. Monroe Street would be configured to operate two tracks of light rail and one westbound traffic lane between S.E. 25th and S.E. 9th Avenues.

   The alignment would pass under the SP branch line and proceed to a transit center at S.E. 21st Avenue. The alignment would then proceed northward to McLoughlin Boulevard, crossing underneath Highway 224 where there could be a park-and-ride station. It would then continue northerly paralleling McLoughlin Boulevard to a park-and-ride station at S.E. Ochoco Street and then continue north.

3.3.2 Milwaukie: Issues

Six issues require continued investigation in this area:

1. *Changes in Comprehensive Plan:* The central Milwaukie area is proposed to be a Regional Center in the Region 2040 Plan. The success of the South/North Project depends, in part, on the integration of the LRT alignment with an on-the-ground transit-supportive land use pattern and related (re)development site plans in Central Milwaukie. As a result, the planning currently underway regarding the Regional Center concept and transportation system plan in Milwaukie may result in changes to the alignment and design options.



South North Transit Corridor Study

Light Rail Design Options:

Milwaukie

Monroe Street

October 1995

Note: Alignment, station and park and ride locations are currently under study and may change.

- Light Rail Transit (LRT) Design Option
- S — Station
- Alternative LRT Alignment
- Existing Railroad
- TC — Transit Center
- PR — Park and Ride

0 1/8 1/4
MILE

METRO

Figure 4

2. *Design and location of Milwaukie Transit Center options*: Notwithstanding land use changes resulting from the Regional Center designation, the design and location of the Milwaukie Transit Center for both the S.E. Monroe Street to East of the Southern Pacific Tillamook Branch Line option and the S.E. Monroe to S.E. 21st Avenue option need to be refined over the next two months to maximize local access and to mitigate displacement and traffic impacts.

3. *Extension to Oregon City:* Pursuant to the Tier I decision, an effort parallel to the DEIS process will consider alternative ways to extend the South/North LRT to Oregon City in a Phase II project. One of the options to be considered would use the McLoughlin Boulevard corridor from downtown Milwaukie. This study may result in refinements/modifications to the light rail alignments, station locations and station sites/designs in central Milwaukie which are incorporated in the EIS[1].

4. *Need to consider land use integration in selecting the preferred alignment through central Milwaukie:* The central Milwaukie alignment is predicated on its integration with a Regional Center plan for the area. If such a plan is not agreed upon by the City of Milwaukie prior to the completion of the DEIS or is not likely to be realized in the foreseeable future, less expensive alignment options serving central Milwaukie will be considered for inclusion in the EIS[1] in lieu of or addition to the currently recommended alignments.

5. *Park-and-ride lot location north of Milwaukie:* A special study of park-and-ride lot locations and capacity will be undertaken for the north Milwaukie area between Highway 224 and S.E. Tacoma Street. The study will identify potential park-and-ride sites which meet the anticipated demand and will use DEIS-level data to select site(s) for inclusion in the EIS[1]. This study will be coordinated with the study proposed under issue 6.

6. *Maintenance facility location north of Milwaukie:* A special study of maintenance facility locations and designs will be undertaken for the north Milwaukie and other areas. The study will identify potential maintenance facility sites and designs which meet the anticipated South/North LRT needs and will use DEIS-level data to select site(s)/design(s) for inclusion in the EIS[1].

3.3.3 Milwaukie: Rationale

One of the fundamental objectives of the South/North LRT Project is to serve the central Milwaukie business district. Two of the options examined in this segment, the SP Main Line option and the Milwaukie Expressway option, would bypass the Milwaukie central business district. As a result, these options fundamentally fail to meet a primary objective of the project and, therefore, are recommended to be eliminated from further consideration.

Each of the three remaining "east-west" alignment options (S.E. Harrison Street, S.E. Washington Street and S.E. Monroe Street) has two "north-south" sub-options (the East of the SP Branch

Line option and the S.E. 21st/Main Street/McLoughlin Boulevard option). For each of the "east-west" alignment options, the following relationship holds for the "north-south" sub-option:

[a] The SP Branch Line option would be shorter, less expensive to build and operate and faster than the S.E. 21st Street/McLoughlin Boulevard option.

[b] The S.E. 21st/Main Street/McLoughlin Boulevard option may better serve City of Milwaukie land use objectives by assisting in the redevelopment of the central business district.

As a result, irrespective of which "east-west" option(s) are recommended in the Milwaukie segment, a fundamental issue in this segment is: are the land use benefits of the S.E. 21st/Main Street/McLoughlin Boulevard sub-option worth its greater costs and longer travel times? To best assess this issue, it is recommended that the DEIS examine both "north-south" sub-options for whichever "east-west" sub-option(s) are proposed.

Regarding the "east-west" sub-options in the Milwaukie segment, the S.E. Monroe Street option is selected for inclusion in the DEIS because:

[a] It would provide better access and wider coverage to the central business district than the S.E. Harrison Street option.

[b] It would be $22 - $28 million ($YOE) less expensive to construct than the S.E. Washington Street option (depending on the north-south sub-option selected) and $4 million ($YOE) less expensive to construct than the S.E. Harrison Street - S.E. Main Street/McLoughlin Boulevard option (the SP Main Line sub-option would be $14 million ($YOE) less expensive with the S.E. Harrison Street option).

[c] It would be $360,000 per year less expensive to operate than the McLoughlin Boulevard/21st Avenue and S.E. Washington Street option (depending on the north-south sub-option selected) and $650,000 - $710,000 per year less expensive to operate than the S.E. Harrison Street options.

[d] It would be 70 - 88 seconds faster (depending on the north-south sub-option), attract 170-190 more boardings per day and exhibit a 17-20% better comparative ratio than the S.E. Washington Street option.

[e] It has greater community support than the other options.

3.4 MILWAUKIE TO PORTLAND CBD

3.4.1 Milwaukie to Portland CBD: Selected Options (See Figures 5 & 6)

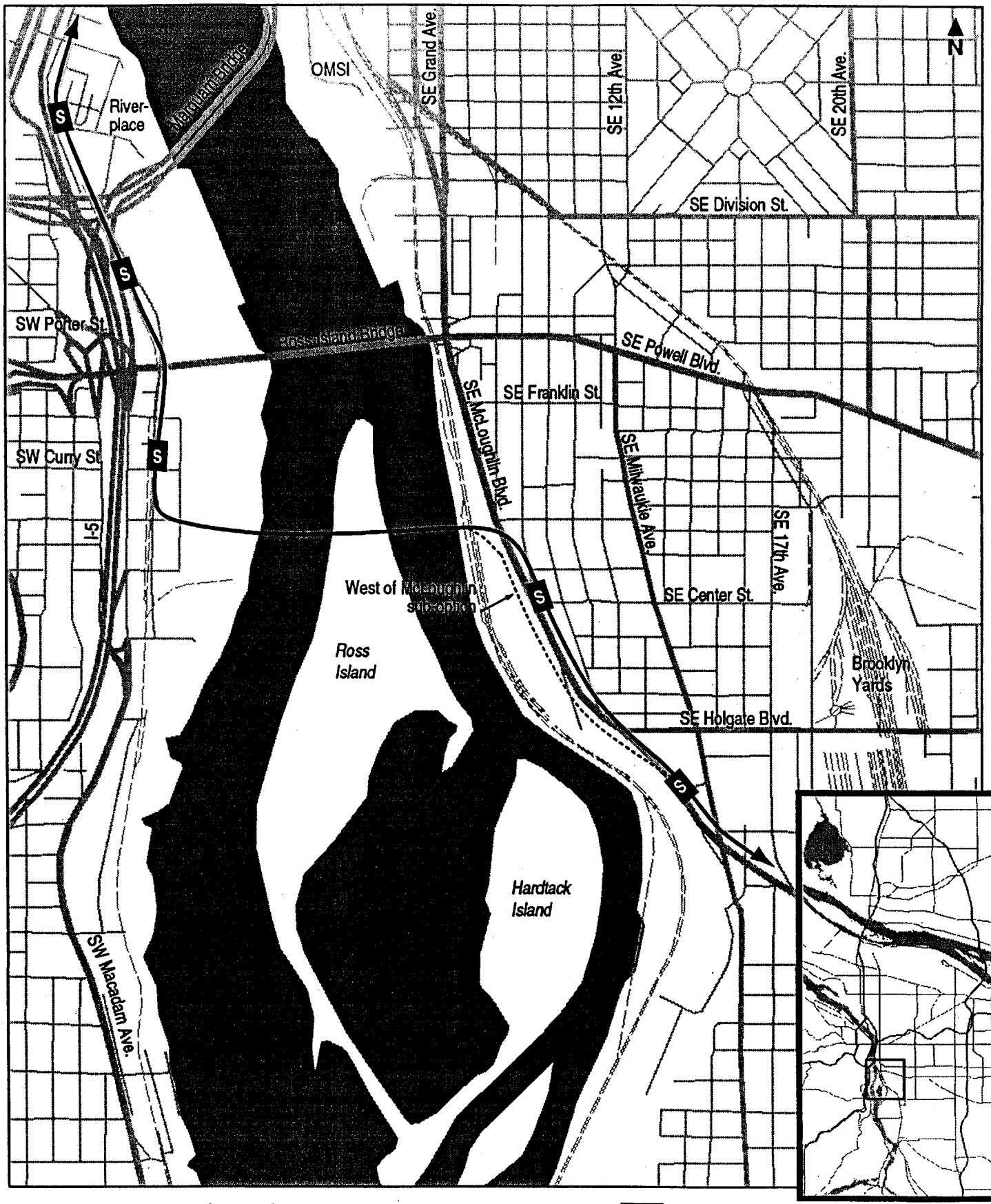
The South/North Project Steering Group determined during the Tier I decision process that both East side/Caruthers Crossing option(s) and Ross Island Crossing option(s) will be carried forward into the DEIS. Thus, the issue at hand is to determine the best Eastside/Caruthers Crossing option and the best Ross Island Crossing option. Based on the Steering Groups direction, two design options are selected to be examined in the DEIS in this segment:

1. *West Brooklyn Yards to Caruthers Modified River Crossing:* From the park-and-ride station at S.E. Ochoco Street, the light rail would proceed parallel to McLoughlin Boulevard (between the existing trees and the S.P. railroad) to a potential station at S.E. Bybee Boulevard. The alignment would continue along S.E. McLoughlin to the vicinity of S.E. Harold Street where it would turn and follow the western boundary of the Brooklyn Yards. A station may be located near S.E. Holgate Boulevard. From there the alignment would continue to follow the west side of the Yards to a potential station in the vicinity of S.E. Rhine/Lafayette Street with pedestrian access across the Brooklyn Yards to the East Brooklyn neighborhood.

   The alignment would continue north, crossing S.E. Powell Boulevard on an elevated structure. The alignment would parallel the existing railroad tracks, passing over S.E. 11th/12th Avenues, where the would be a potential station. From there, it would continue parallel to the existing railroad tracks to a potential elevated station just south of OMSI.

   From the OMSI station, the Caruthers Modified River Crossing would leave the east bank of the Willamette River in the vicinity of Water Avenue and continue on structure to the west side of S.W. Moody Avenue. The alignment would weave between columns supporting the Marquam Bridge towards a station at Riverplace.

2. *North Ross Island River Crossing:* From the park-and-ride station at S.E. Ochoco Street, the light rail alignment would proceed parallel to McLoughlin Boulevard (between the trees and the railroad right-of-way) to potential stations at S.E. Bybee Boulevard, the vicinity of S.E. 16th and S.E. Milwaukie Avenues and S.E. Center Street and McLoughlin Boulevard. From the Center Street station, the alignment would continue north along S.E. McLoughlin a short distance to S.E. Bush Street, cross under S.E. McLoughlin Boulevard and cross the Willamette River on structure in the vicinity of the northern tip of Ross Island. The light rail bridge would land on the west side of S.W. Moody Avenue with a potential station in the vicinity of S.W. Curry Street. The alignment would then follow the west side of S.W. Moody Avenue to a S.W. Porter Street station and then proceed towards a station at Riverplace.



South North Transit Corridor Study

Light Rail Design Options:

South Willamette River Crossing

North Ross Island

Figure 5

Light Rail Transit (LRT) Design Option

Station

Alternative LRT Alignment

Existing Railroad

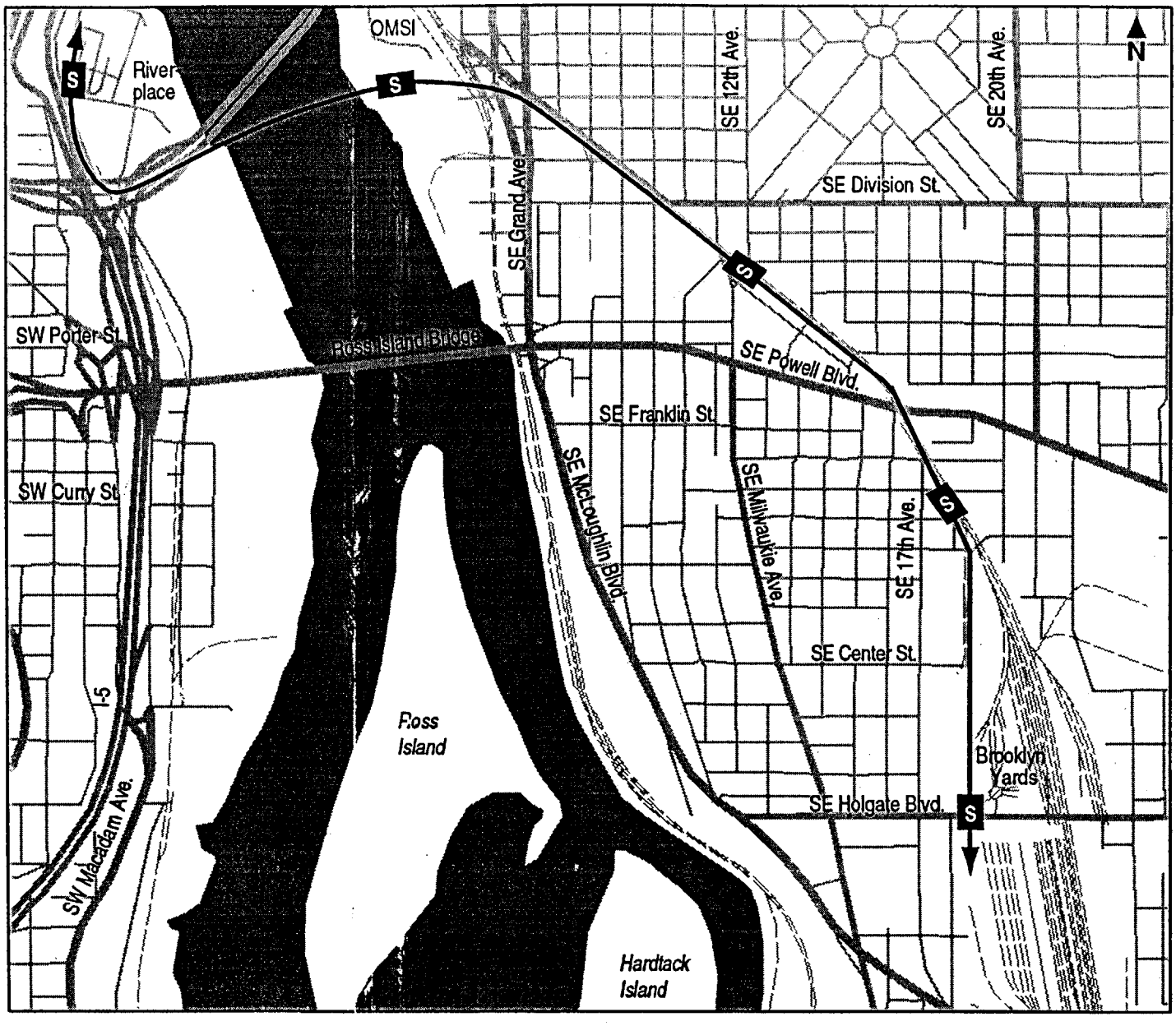
TC Transit Center

PR Park and Ride

0 1/8 1/4 MILE

Note: Alignment, station and park and ride locations are currently under study and may change.

METRO



South North Transit Corridor Study

Light Rail Design Options:

South Willamette River Crossing

Caruthers Modified - West Brooklyn Yards

October 1995

Light Rail Transit (LRT) Design Option

S Station

Alternative LRT Alignment

Existing Railroad

TC Transit Center

PR Park and Ride

0 1/8 1/4 MILE

Note: Alignment, station and park and ride locations are currently under study and may change.

METRO

Figure 6

3.4.2 Milwaukie to Portland CBD: Issues

Three issues require continued investigation in this segment:

1. *Actual location of the North Ross Island Crossing:* While drawings to date have shown the North Ross Island Crossing option to follow S.W. Gaines Street in the North Macadam area, it is possible that it might be located within a narrow band south of that location. Project staff will work with interested parties to determine an appropriate location to include in the DEIS.

2. *Alternate North Ross Island alignment (West of McLoughlin Boulevard Sub-Option):* A variation on the North Ross Island option would have the light rail alignment proceed north of a potential station at S.E. Holgate Boulevard on the west side of S.E. McLoughlin Boulevard to about S.E. Rhone Street where the light rail alignment would begin to elevate and curve to the west. The North Ross Island bridge would be in the same general vicinity as described above. This sub-option would have additional expense and lower ridership, but could also have less potential residential property displacement in the Brooklyn neighborhood. The West of McLoughlin sub-option will be further developed in parallel to the EIS process.

3. *Choice between the North Ross Island crossing alternative and the West Brooklyn Yards/Caruthers crossing alternative:* This choice will be one of the major issues to be resolved during the DEIS process. An important basis for making this determination will focus on the progress that has been made along both options to plan and develop transit-oriented land uses. Issues of density, timing and certainty of development, parking, integration of light rail with major attractors and similar factors will be taken into consideration.

3.4.3 Milwaukie to Portland CBD: Rationale

The West Brooklyn Yards to Modified Caruthers Bridge option is selected for inclusion in the DEIS because:

[a] In comparison to the PTC/McLoughlin Boulevard option, the Brooklyn Yard options would provide significantly better transit access and service to the inner east side neighborhoods, offer five minute walk access to 4,100 - 4,600 more employees (in the year 2015), attract 1,400 - 1,600 more light rail boardings in this segment and exhibit 42% - 57% better comparative ratios.

[b] The West Brooklyn Yard option would be $42 million ($YOE) less expensive to construct, impact less commercial and residential buildings, and exhibit a 10% better comparative ratio than the East Brooklyn Yard option.

[c] The Caruthers Modified option would cost $18 million ($YOE) less to construct, $370,000 per year less to operate and would be over 1 minute faster than the Caruthers "S" option.

[d] While estimated to cost $8 - $9 million ($YOE) more to construct than the Caruthers and Caruthers/Marquam options, the Caruthers Modified option would have the least negative impacts on the redevelopment property south of the Marquam Bridge and avoids significant adverse impacts on PDC's two remaining parcels in Riverplace and privately-owned properties south of the Marquam Bridge.

The North Ross Island option is selected for inclusion in the DEIS because:

[a] The North Ross Island option would provide the best combination of (re)development potential, ridership and cost of the Ross Island crossing options. This is exhibited by the North Ross Island option having the lowest (best) comparative ratio.

[b] The South Parallel Ross Island option could have an adverse visual impact on the Ross Island Bridge which is eligible for the National Register of Historic Places. As such, there could be Section 106 (historical resources) problems with the South Parallel Ross Island option.

[c] The South Parallel Ross Island option would not provide a station in the North Macadam District, the station would have to be north of the existing Ross Island Bridge. In addition, it would attract less 1,800 - 2,000 daily LRT segment boardings, impact 28 - 45 more residential units and exhibit a 31% poorer comparative ratio than the other Ross Island Crossing options.

[d] The Mid Ross Island Crossing option would cost $54 million ($YOE) more to construct than the North Ross Island Crossing option. In addition, the construction of the Mid-Ross Island Crossing option raises a higher risk of negatively impacting the Great Blue Heron rookery buffer area on Ross Island. The North Ross Island crossing would potentially have less impact on the Willamette River ecosystem due to fewer piers in the river as compared to the South Parallel option.

[e] There is generally stronger community support for the North Ross Island Crossing than for the other Ross Island crossing options.

3.5 PORTLAND CBD

3.5.1 Portland CBD Options

The Portland CBD alignment and station locations to be carried forward into the DEIS are recommended under separate cover.

3.6 STEEL BRIDGE TO KAISER MEDICAL FACILITY VICINITY

3.6.1 Steel Bridge to Kaiser Medical Facility Vicinity: Selected Options (See Figures 7& 8)

In this segment, two design options are selected to be examined in the DEIS:

1. *East I-5/N. Kerby Avenue:* The alignment would proceed eastward from a slightly relocated Rose Garden transit station, run underneath the I-5 freeway and turn north along the eastern edge of I-5. It would then run along the edge of I-5 to a transit station serving the N.E. Broadway area and adjacent Eliot neighborhood. The alignment would continue along the east edge of I-5, behind the Harriet Tubman Middle School, crossing N. Russell Street on structure, to a station on N. Kerby Avenue between N. Graham and N. Stanton Streets at Emanuel Hospital. The alignment would curve westward, passing over I-5 on structure to a location just west of the freeway and then proceed northerly to the Edgar Kaiser clinic.

2. *N. Wheeler Avenue/N. Russell Street:* The alignment would pass along the eastern edge of the Rose Garden Arena with a potential station north of the arena near N. Weidler. It would cross N. Broadway and N. Weidler at street level and proceed north along the east side of N. Flint Avenue. The alignment would turn westerly at N. Russell Street with a potential station on Russell Street at the south end of the Emanuel Hospital campus. It would elevate on a structure and pass over N. Kerby Avenue, Stanton Yard and N. Mississippi Avenue. The alignment would then curve westward, passing over I-5 on structure to a location just west of the freeway and then proceed north to the Edgar Kaiser clinic.

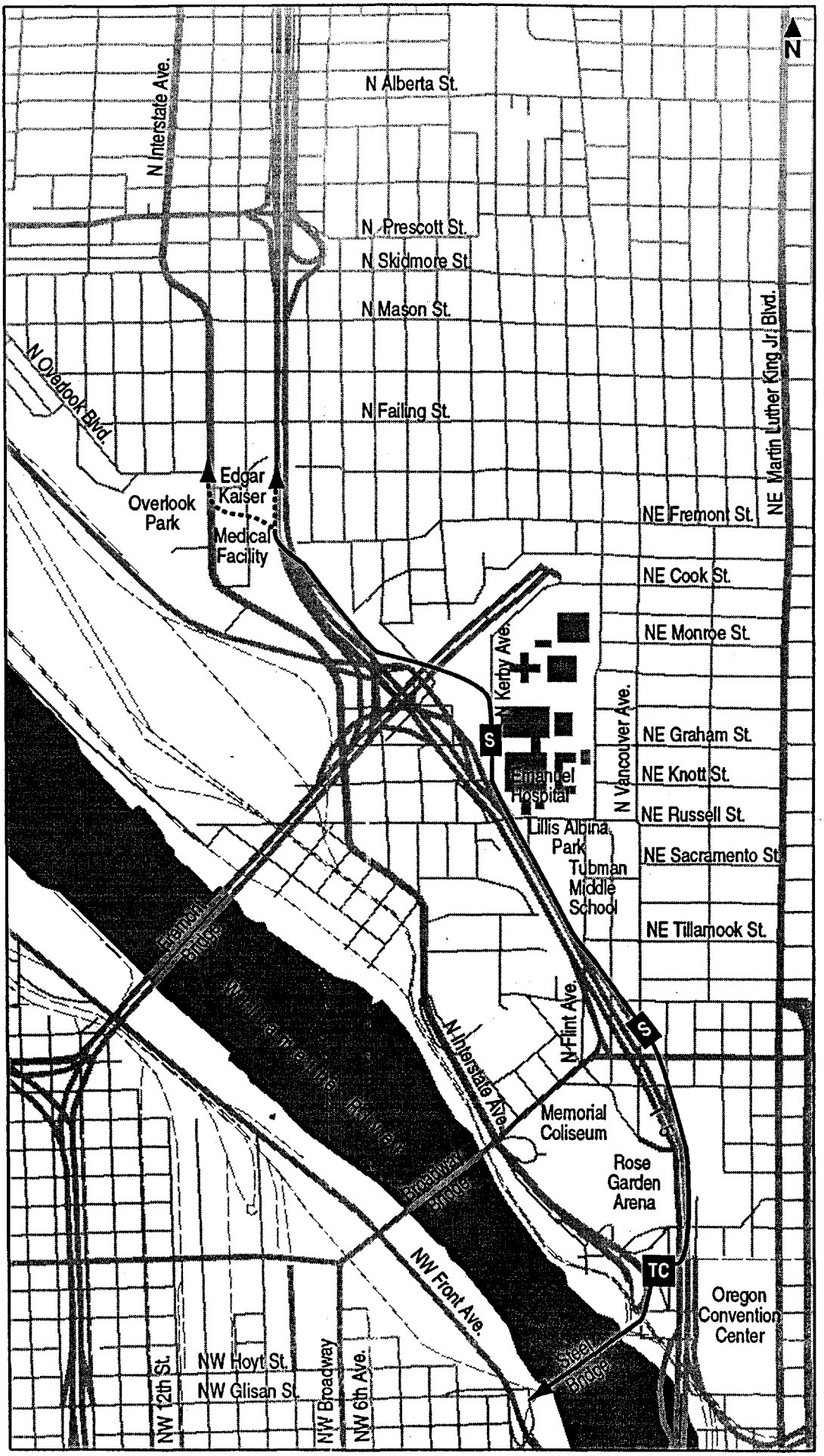
3.6.2 Steel Bridge to Kaiser Medical Facility: Issues

Three issues require continued investigation in this area:

1. *Design of the N.E. Broadway Station with the East I-5 option:* Initial designs for this station were below-grade (and may not provide a pleasant environment for users or good pedestrian connections between Broadway and the Rose Quarter). Project staff will investigate refined designs which mitigate these concerns.

2. *Design and location of stations on the N. Wheeler Avenue/N. Russell Street:* The station locations along this alignment should be refined during the next two months to ensure that access into the Eliot neighborhood and Emanuel Hospital is maximized.

3. *Mitigate operational issues associated with the N. Wheeler/N. Russell and East I-5 options:* The N. Wheeler Avenue/N. Russell Street and East I-5 options could present difficult operational problems and conflicts between light rail, auto traffic and/or



South North Transit Corridor Study

Light Rail Design Options:

Steel Bridge to Kaiser

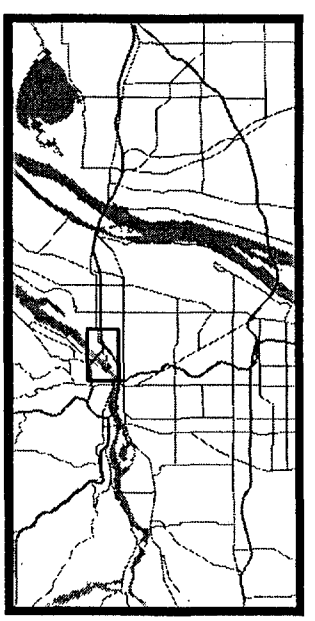
East I-5 / Kerby

September 1995

Note: Alignment, station and park and ride locations are currently under study and may change.

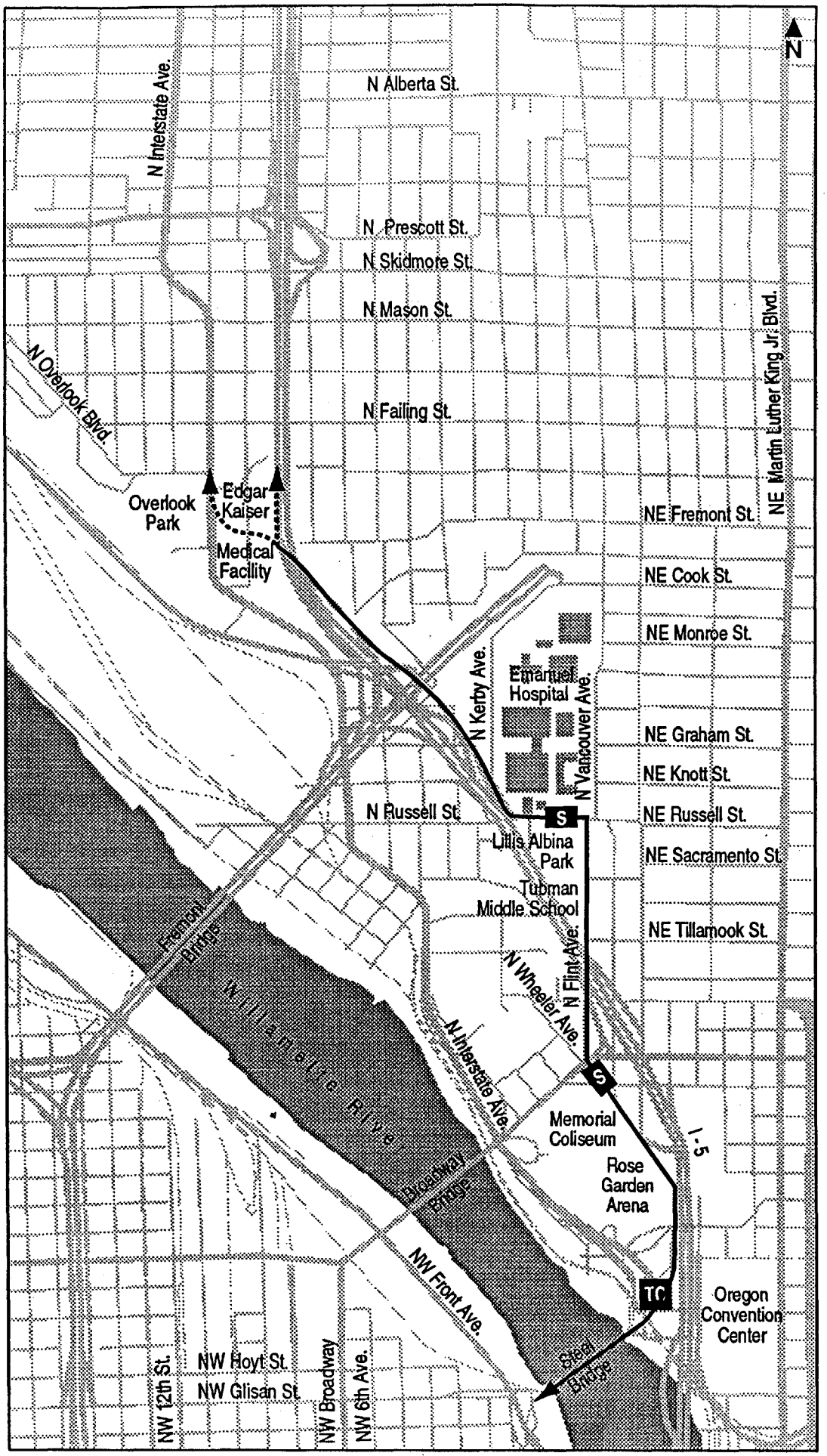
- Light Rail Transit (LRT) Design Option
- S — Station
- Alternative LRT Alignment
- Existing Railroad
- TC — Transit Center
- PR — Park and Ride

0 1/8 1/4
MILE



METRO

Figure 7



South North Transit Corridor Study

Light Rail Design Options:

Steel Bridge to Kaiser

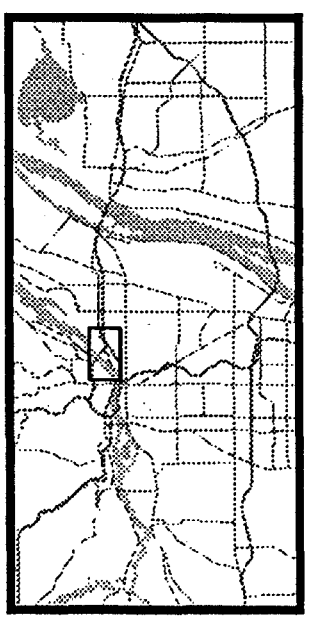
Wheeler / Russell

September 1995

Note: Alignment, station and park and ride locations are currently under study and may change.

- Light Rail Transit (LRT) Design Option
- S — Station
- Alternative LRT Alignment
- Existing Railroad
- TC — Transit Center
- PR — Park and Ride

0 1/8 1/4 MILE



METRO

Figure 8

pedestrians. Methods to mitigate these potential problems will be analyzed prior to and during the DEIS process.

4. *In the Broadway/Weidler Interchange Area:* Alignment options for light rail should be incorporated into an integrated design with I-5 and street system impropements in order to improve circulation for automobiles, pedestrian and bicycles and which would optimize bus and LRT operations.

3.6.3 Steel Bridge to Kaiser Medical Facility: Rationale

The East I-5/N. Kerby Avenue and N. Wheeler Avenue/N. Russell Street options are selected for inclusion in the DEIS because:

[a] The East I-5/N. Kerby Avenue provides the best combination of cost, ridership, travel time and light rail access as evidenced by having the lowest (best) comparative ratio. It would provide stations which would serve both the Eliot neighborhood and the Emanuel Hospital campus. In addition, it would attract the highest light rail boardings in this segment amongst all of the alignment options.

[b] The N. Wheeler/N. Russell Street option may provide the best access to the Eliot neighborhood and the best redevelopment opportunities amongst all options in this segment. It also provides more flexibility in the station placement within the Eliot neighborhood than would the N. Wheeler/N. Flint option.

[c] The West I-5 option, while would serve the industrial sanctuary between I-5 and the Willamette River, is not selected for further study because it would not adequately serve the Eliot neighborhood or Emanuel Hospital which are the priority areas to be served. Light rail users wishing to access Emanuel Hospital or the Eliot neighborhood from the N. Graham Street station would have to walk-up an eighty foot elevation change. Moreover, by servicing the industrial sanctuary, the West I-5 option may create non-industrial redevelopment pressures which contradict City objectives for this area.

3.7 KAISER MEDICAL FACILITY TO EXPO CENTER

3.7.1 Kaiser Medical Facility to Expo Center: Selected Options (See Figures 9 & 10)

The South/North Steering Group determined that an Interstate Avenue and an I-5 alignment alternative would be advanced into the DEIS for further study and that various design options and crossover combinations of the alignment alternatives would be developed, evaluated and narrowed within the Design Option Narrowing Process.

One design option for each alignment alternative is selected for further study within the DEIS:

1. *All I-5 Alignment:* From Emanuel Hospital, the light rail alignment would pass beneath the I-405 ramps and climb-up along the eastern edge of I-5. From the potential station at the Kaiser clinic, the light rail alignment would proceed north along the top of the western bank of the I-5 freeway to a station south of N. Skidmore Street.

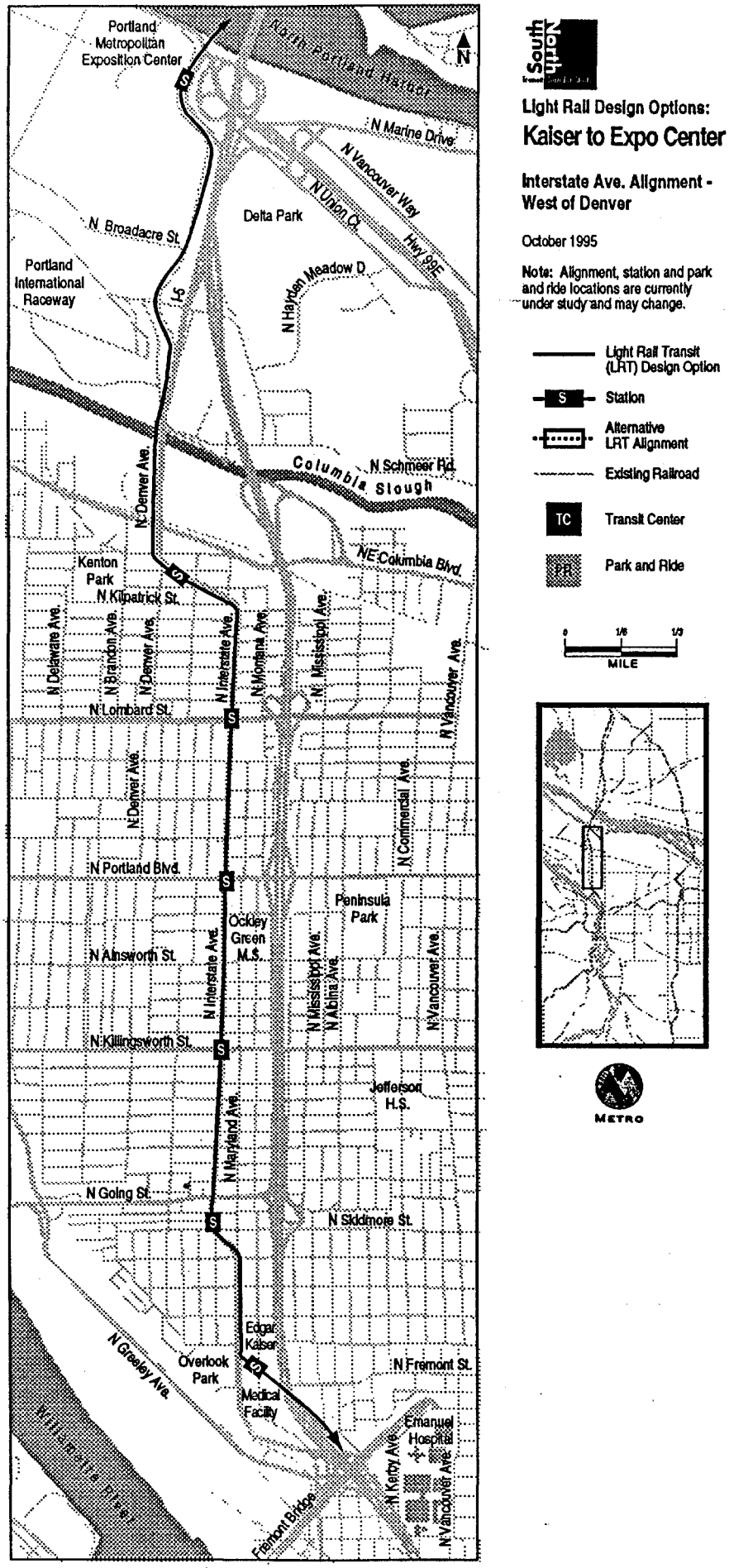
   It would then continue north, passing beneath N. Going Street in a box structure, then running above the freeway along N. Minnesota Avenue (west of the freeway ramps) from N. Going Street to a potential station at N. Killingsworth Street. It would then proceed along the top of the freeway bank and then curve west along the freeway ramps to a potential station on the south side of N. Portland Boulevard. The alignment would cross N. Portland Boulevard at street level and continue north along the west bank of the freeway to a potential station on the south side of N. Lombard Street. It would then pass over N. Lombard and the adjacent freeway ramps on a structure and proceed northerly to a potential Kenton station at N. Kilpatrick Street.

   From the Kenton station, the alignment would proceed northerly along the west side of the I-5 freeway. It would cross over N. Columbia Boulevard and the Columbia Slough on a bridge, and then lower to ground level. It would then pass Delta Park and begin to elevate for about 1/2 mile and crossover Highway 99 adjacent to Expo Road. An elevated potential station would be located near the Expo Center parking lot.

2. *All Interstate Avenue and West of Denver Avenue Alignment:* From Emanuel Hospital, the light rail alignment would pass beneath the I-405 ramps and climb-up along the eastern edge of I-5. It would crossover I-5 on a structure near N. Fremont Street and then proceed across the Kaiser campus with a diagonal street level station near the existing Town Hall building.

   The alignment would then turn onto N. Interstate Avenue near N. Overlook Boulevard. From there, the alignment would proceed northerly in the center of N. Interstate Avenue. One lane of auto traffic in each direction would be provided except at the approaches to N. Going Street and N. Lombard Street where two lanes of traffic in each direction would be provided. All intersections would be crossed at street level. Potential stations would be located at N. Skidmore Street, N. Killingsworth Street, N. Portland Boulevard, N. Lombard Street and the Kenton commercial district.

   From the Kenton station, the alignment would follow the west side of N. Denver Avenue viaduct (the "West of Denver" option). It would proceed northerly across N. Columbia Boulevard and the Columbia Slough on a bridge, pass West Delta Park and follow Expo Road to an elevated potential station near the Expo Center parking lot.



South North

Light Rail Design Options:

Kaiser to Expo Center

Interstate Ave. Alignment - West of Denver

October 1995

Note: Alignment, station and park and ride locations are currently under study and may change.

- Light Rail Transit (LRT) Design Option
- S — Station
- Alternative LRT Alignment
- Existing Railroad
- TC — Transit Center
- PR — Park and Ride

0 1/6 1/3 MILE

METRO

Figure 9

3.7.2 Kaiser Medical Facility to Expo Center: Issues

Four issues require continued investigation in this area:

1. *Design of Interstate Avenue option for auto traffic:* The configuration and operation of the traffic lanes on and intersecting Interstate Avenue (in the Interstate Avenue option) will be refined during the next two months.

2. *Choice between the I-5 option and the Interstate Avenue option:* This choice will be one of the major issues to be resolved during the DEIS process. An important basis for making this determination will focus on the ability to plan and develop transit-oriented land uses around stations. Issues of density, timing and certainty of development, parking, integration of light rail with major attractors, equity, capital cost, light rail travel speed/time, reliability, ridership, neighborhood cohesiveness and similar factors will be taken into consideration when evaluating these two options.

3. *Design and location of stations in the Kaiser Medical Facility to Expo Center segment:* The station locations along this segment will be refined during the next two months to ensure that access into the neighborhood is maximized and feeder bus service is efficiently provided.

4. *Crossovers:* The desirability and preferred location for a crossover between the I-5 alignment and the Interstate Avenue alignment has not been determined as part of the Tier I process. At this time, no crossover option will be studied in the DEIS. In making this determination, the Steering Group notes that the DEIS will focus on the key issue in this segment -- the relative merits and impacts of the Interstate Avenue and I-5 alignment options. Following completion of the results reports for the DEIS, staff will report back to the PMG, CAC and Steering Group to determine which crossover warrants further study.

5. *Expo Center and Portland International Raceway Stations:* Through the information developed for the DEIS, an assessment will be made as to the cost-effectiveness of the Expo Center Station. If that analysis concludes that and Expo Center station is not warranted, the alignment over Marine Drive may be redesigned. In addition, a possible future station serving the Portland International Raceway may be included within the design if future analysis indicates that it would be warranted.

3.7.3 Kaiser Medical Facility to Expo Center: Rationale

The Interstate Avenue option would provide a light rail alignment that is more centrally located in North Portland neighborhoods than the I-5 option and may enhance certain land use opportunities. Conversely, the I-5 option would cost less to construct, would provide faster travel speeds to more users, provide better access to neighborhoods east of I-5 and may not be subject to the operational and traffic problems inherent in the Interstate Avenue option. These are

key trade-offs for which information is not yet available to forge a consensus decision. Thus, it is essential that both options be further examined in the DEIS.

3.8 EXPO CENTER TO V.A. HOSPITAL/CLARK COLLEGE VICINITY

3.8.1 Expo Center to V.A. Hospital/Clark College Vicinity: Selected Options (See Figures 11, 12 & 13)

In this segment, one design option is selected to be examined in the DEIS:

1. *West of I-5/Lift Span Bridge/Washington Street (2-way)/E. McLoughlin Boulevard:* From the Expo Center, the alignment would proceed north over N. Marine Drive, North Portland Harbor and N. Jantzen Avenue on a bridge structure. The alignment would pass under the I-5 ramps (Sub-option B: Under the I-5 Ramps), then continue northerly along the westside of the freeway to a new lift span bridge crossing the Columbia River. The light rail bridge would parallel the westside of the existing I-5 bridge and would be approximately the same height above the river. The bridge would pass over Columbia Way in Vancouver and then would cross under the railroad berm before connecting with Washington Street. Washington Street would operate in a two-way light rail configuration (2-Way on Washington Option). The light rail alignment would proceed northerly on Washington Street to stations at W. 7th Street, between W. 11th and W. 12th Streets and between W. 16th and W. 17th Streets. At McLoughlin Boulevard, the alignment would curve easterly, proceeding along E. McLoughlin Boulevard to the east side of I-5. A station would be potentially located on E. McLoughlin Boulevard between "D" and "E" Streets. The alignment would cross under I-5 and then turn northerly and proceed along the east side of I-5 to a park-and-ride station in the vicinity of the Veterans Hospital. The alignment would then turn easterly, proceeding to the terminus station west of Fort Vancouver Way.

3.8.2 Expo Center to V.A. Hospital/Clark College Vicinity: Issues

One issue requires continued investigation in this area:

1. Clark County Transportation Futures Process: The outcome of Clark County's "Transportation Futures" study may necessitate changes to the light rail alignment, station locations, park-and-ride facility design(s) and location(s) and terminus in this segment.

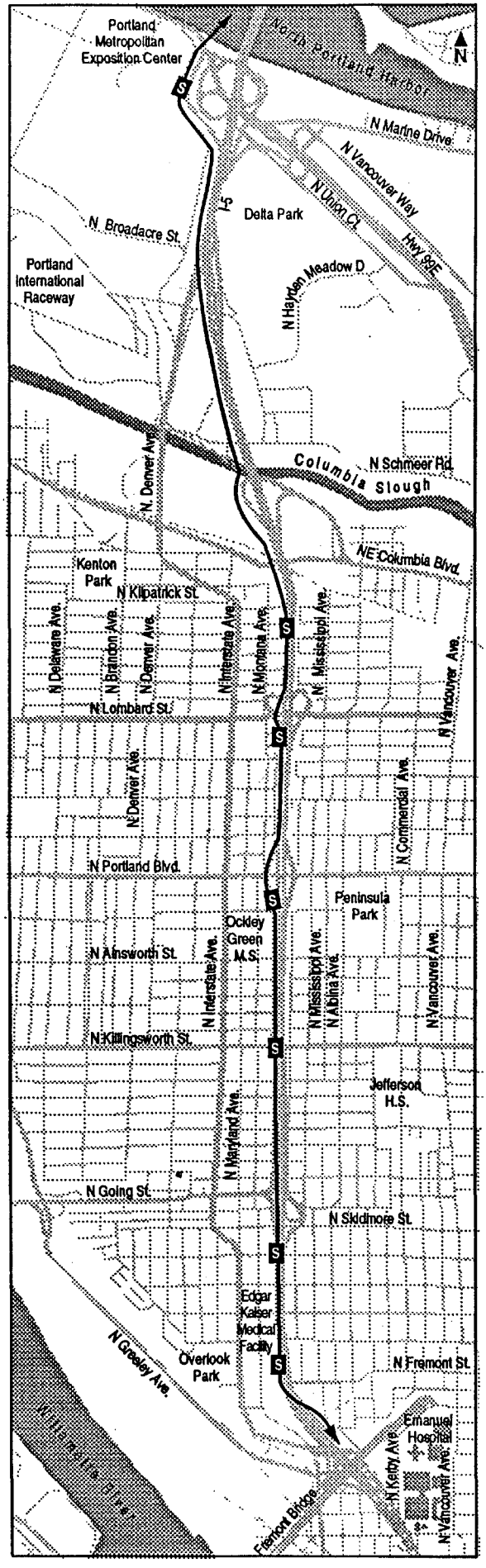
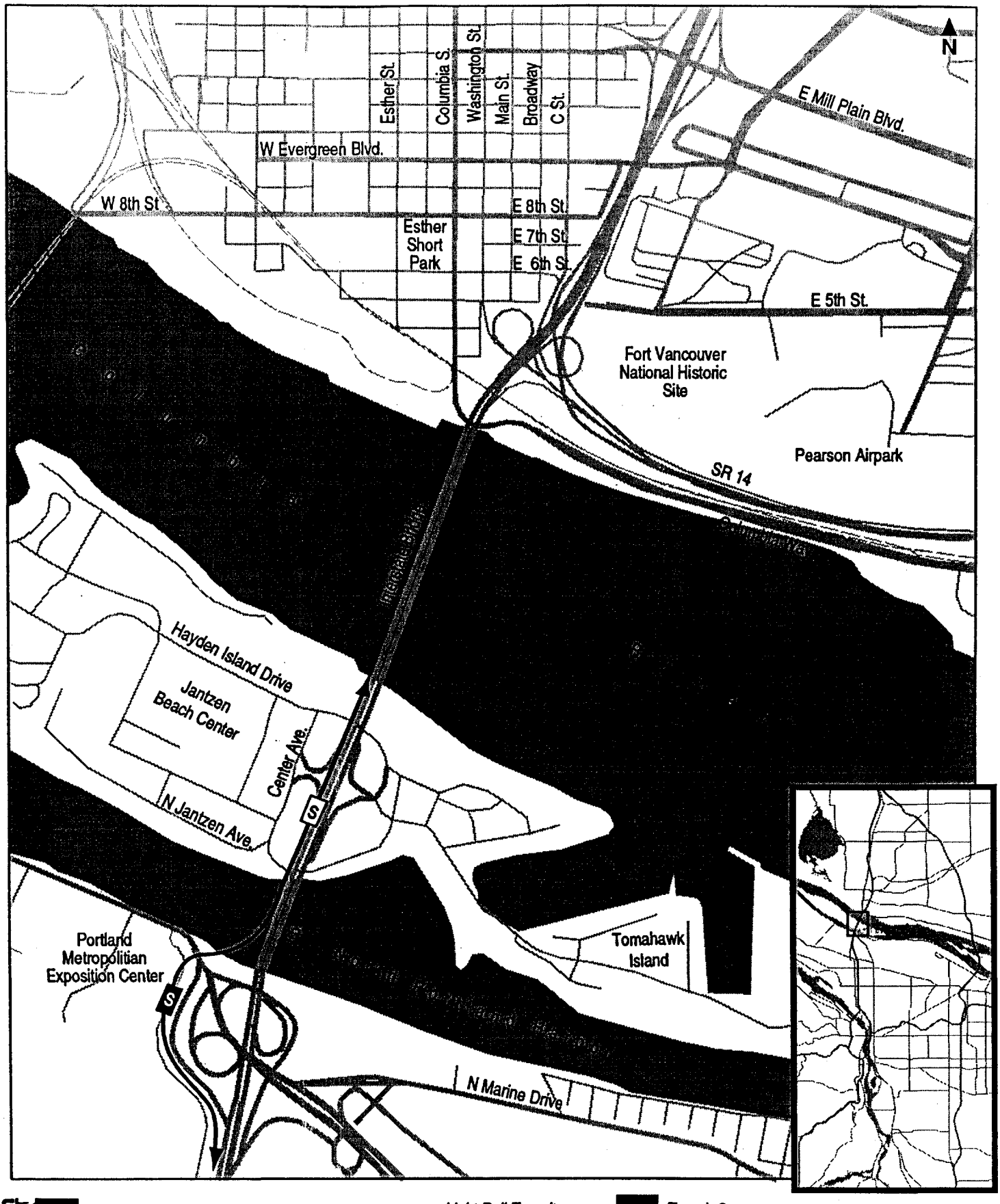

Portland Metropolitan Exposition Center
North Portland Harbor
N
N Marine Drive
N Vancouver Way
N Union Ct.
Hwy 99E
N Broadacre St.
Delta Park
Portland International Raceway
N Hayden Meadow D
N Schmeer Rd.
Columbia Slough
N. Denver Ave.
NE Columbia Blvd.
Kenton Park
N Kilpatrick St.
N Delaware Ave.
N Brandon Ave.
N Denver Ave.
N Interstate Ave.
N Montana Ave.
N. Mississippi Ave.
N Vancouver Ave.
N Lombard St.
N Denver Ave.
N Commercial Ave.
N Portland Blvd.
Peninsula Park
Ockley Green M.S.
N Ainsworth St.
N Interstate Ave.
N Mississippi Ave.
N Albina Ave.
N Vancouver Ave.
N Killingsworth St.
Jefferson H.S.
N Maryland Ave.
N Going St.
N Skidmore St.
Edgar Kaiser Medical Facility
N Greeley Ave.
Overlook Park
N Fremont St.
Emanuel Hospital
N Kerby Ave.
N Vancouver Ave.
Fremont Bridge
North
South
Light Rail Design Options:
Kaiser to Expo Center
I-5 Alignment
October 1995
Note: Alignment, station and park and ride locations are currently under study and may change.
Light Rail Transit (LRT) Design Option
S
Station
Alternative LRT Alignment
Existing Railroad
TC
Transit Center
PR
Park and Ride
0
1/6
1/3
MILE
METRO

Figure 10



South North Corridor Study

Light Rail Design Options:

Expo Center to Hayden Island

West of I-5 (under ramps)

Figure 11

Light Rail Transit (LRT) Design Option

S Station

Alternative LRT Alignment

Existing Railroad

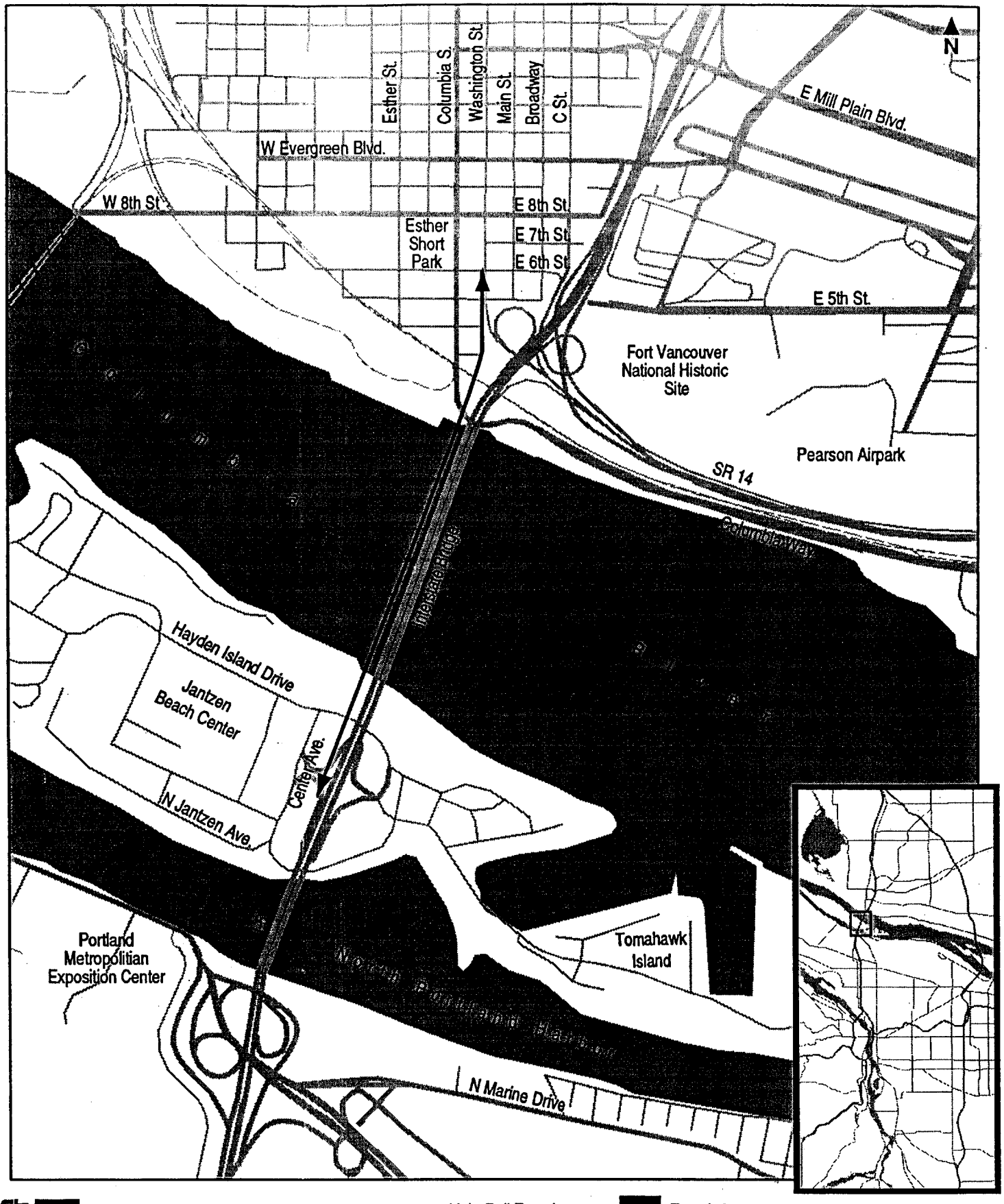
TC Transit Center

PR Park and Ride

0 1/8 1/4 MILE

Note: Alignment, station and park and ride locations are currently under study and may change.

METRO



South North Corridor Study

Light Rail Design Options:

Columbia River Crossing

Lift Span Bridge

Figure 12

Light Rail Transit (LRT) Design Option

S Station

Alternative LRT Alignment

Existing Railroad

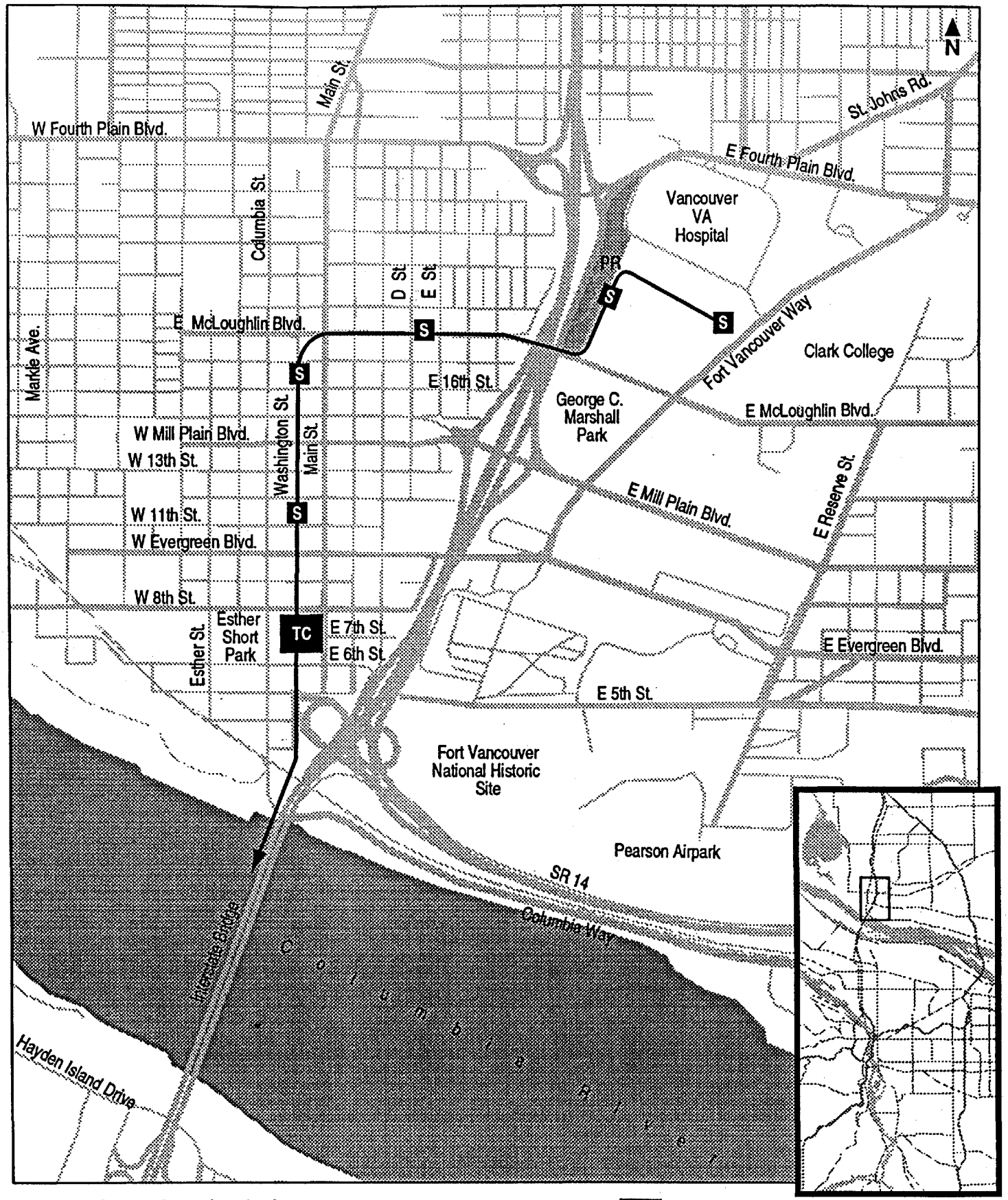
TC Transit Center

PR Park and Ride

0 1/8 1/4 MILE

Note: Alignment, station and park and ride locations are currently under study and may change.

METRO



South North Transit Corridor Study

Light Rail Design Options: Downtown Vancouver to VA Hospital/ Clark College

2-Way on Washington

Figure 13

Light Rail Transit (LRT) Design Option

Station

Alternative LRT Alignment

Existing Railroad

TC Transit Center

PR Park and Ride

0 1/8 1/4 MILE

Note: Alignment, station and park and ride locations are currently under study and may change.

METRO

33.8.3 Expo Center to V.A. Hospital/Clark College Vicinity: Rationale

The West of I-5/Lift Span Bridge/Washington Street (2-way)/E. McLoughlin Boulevard alignment is selected to be included in the DEIS because:

[a] Between Expo Center and Hayden Island, the West of I-5 Under the Ramps option is selected for inclusion in the DEIS because it would be the least expensive of the West of I-5 options, it would not create a barrier which divides Hayden Island as do the Center Street and Adjacent to Jantzen Beach Center options and would have the minimum traffic impacts.

[b] The Lift Span bridge is selected for inclusion in the DEIS over the Bored Tunnel option because it would be $101 million ($YOE) less expensive, would have considerably less adverse impacts on Hayden Island and downtown Vancouver and would provide centrally located access through downtown Vancouver and which would be in proximity to major redevelopment sites. The LRT bridge can be built using techniques that would minimize effects on the Columbia River ecosystem.

[c] The Two-Way on Washington Street Option is selected for inclusion in the DEIS because, compared to the other Vancouver CBD alignment options, it would be the least expensive to construct, would exhibit the fastest travel times, would attract the highest ridership, has the highest level of public support and would be the most consistent with the development and redevelopment objectives in downtown Vancouver.

South North
Transit Corridor Study

Appendix A

Design Options Considered

Design Option Narrowing by Segment

The following provides a quick look at the Project Management Group recommendations. Refer to the maps inside to locate specific design options selected by the group for further study.

1. South Terminus (end point)

Terminus
- Sunnyside area
- 84th Avenue CTC
- 93rd Avenue Town Center area
- Highway 212/224

CTC Alignment
- North of CTC
- South of CTC

2. Railroad Avenue/Highway 224:

- Railroad Avenue
- North of Highway 224
- South of Highway 224

3. Central Milwaukie

- Monroe Street and 21st /McLoughlin
- Monroe Street and SP branch line
- Washington to 21st/McLoughlin
- Washington Street and SP branch line
- Harrison Street and 21st Street/McLoughlin
- Harrison Street and SP branch line
- Clackamas Highway
- Southern Pacific main line

Between the Milwaukie and River Crossing segments, only a SE McLoughlin Boulevard option is being considered.

4. South Willamette River Crossing

Caruthers Eastside
- West Brooklyn Yards
- PTC/McLoughlin Boulevard
- East Brooklyn Yards

Caruthers Crossing
- Caruthers Modified
- Caruthers "S"
- Caruthers
- Caruthers/Marquam

Ross Island Crossing
- North Ross Island
- South Parallel Ross Island
- Mid Ross Island

6. Steel Bridge to Kaiser Clinic

- East I-5 and Kerby Street station
- Wheeler Avenue and Russell Street station
- Wheeler Avenue and Flint Street station
- West of I-5 Alignment and Graham Street station

7. Kaiser Clinic to Expo Center

- All Interstate Avenue alternative
- All I-5 alternative
- North Killingsworth crossover
- North Portland Blvd. crossover
- Kenton area crossover

8. Expo Center to Hayden Island

- West of I-5 freeway (under ramps)
- West of I-5 (over ramps)
- Adjacent to Jantzen Beach Center
- Center Avenue

9. Columbia River Crossing

- Lift span bridge
- Bored tunnel

10. Downtown Vancouver to VA Hospital/Clark College

- Two-way on Washington Street
- Washington/Main Street couplet

In August 1995, following an extensive effort to involve the public in the creation of the Clark County and Vancouver Transportation Futures process, C–TRAN amended the northern Phase I terminus from 99th Street to Veterans Administration Hospital/Clark College. Design options previously developed for the North Vancouver and Clark County segments will be narrowed as part of the future phase two extension process.

11. North Vancouver

- Two-way on Main Street
- Main/Broadway Street couplet to two-way on Main
- Two-way on Broadway to two-way on Main
- McLoughlin Boulevard to East of I-5 freeway

12. Clark County

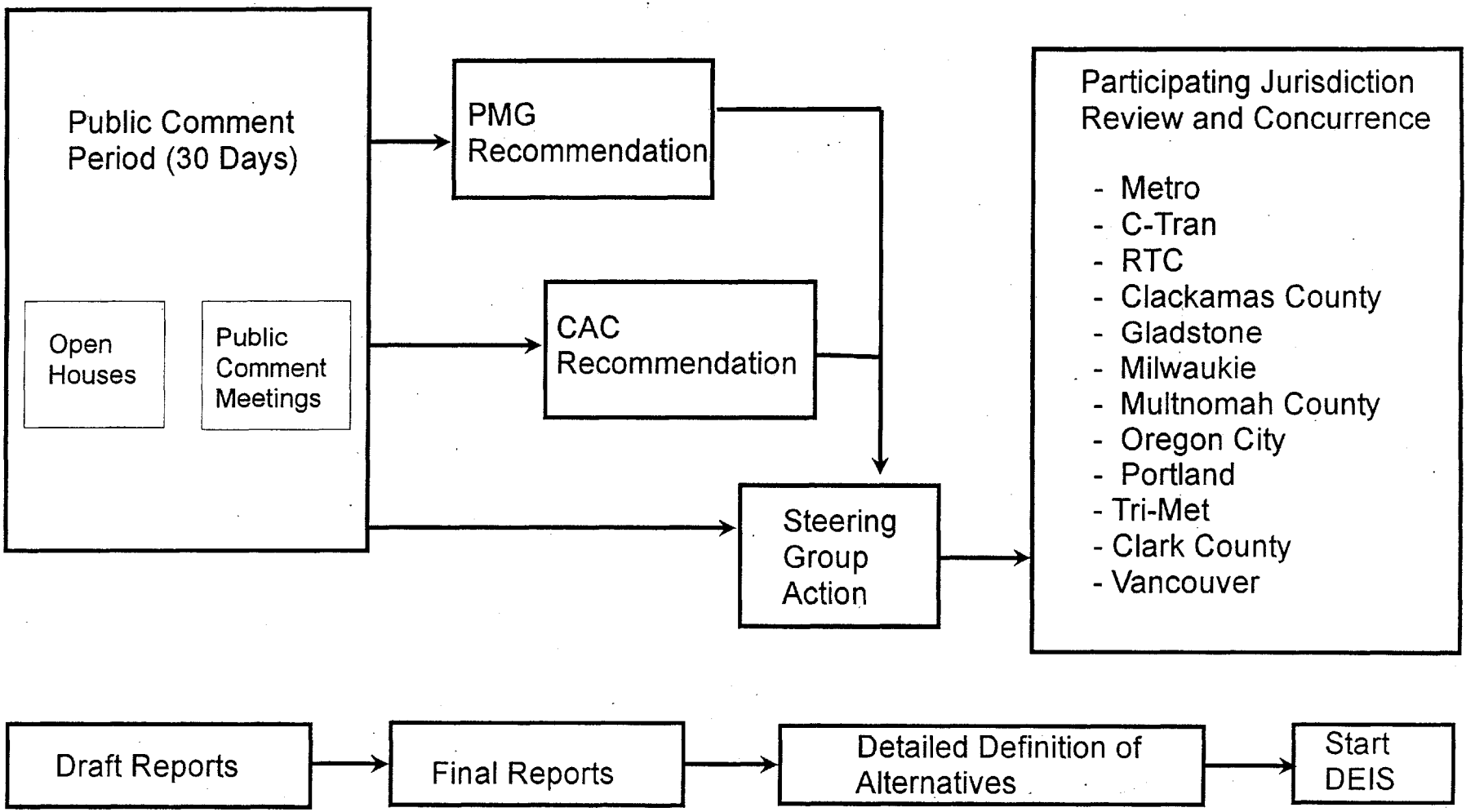
- Stations at 63rd, 72nd, 88th and 105th streets
- Stations at 63rd, 78th, 88th and 105th streets
- Stations at 63rd, 88th and 105th streets
- Stations at 63rd, 72nd, 82nd and 95th streets
- Stations at 63rd, 82nd and 95th streets

South North
Transit Corridor Study

Appendix B

Design Option Narrowing Process

South/North
Design Option Narrowing Process



South North
Transit Corridor Study

Appendix C

Design Options Narrowing Criteria and Measures

Criteria for Evaluating Design Options During Tier I

NARROW MODAL ALTERNATIVES	NARROW ALIGNMENT ALTERNATIVES	NARROW DESIGN OPTIONS	NARROW STUDY TERMINI ALTERNATIVES
Modal Alternatives which result from the Scoping Process will be carried through Tier I	**Alignment Alternatives which result from the Scoping Process will be carried through Tier I**	**Transit Service** **– *Ease of Access*** **– *Transferability*** **Transit Operations** **– *Modal Compatibility*** **Ability to Accommodate Growth** **– NA –** **Minimize Traffic and Neighborhood Infiltration** **– NA –** **Promote Land Use Desired Patterns and Development** **– *Support Major Activity Centers*** **– *Support Bi-State Policies*** **Fiscal Stability and Efficiency** **– *Cost*** **Engineering Efficiency and Environmental Sensitivity** **– *Environmental Impacts*** **– *Design Considerations***	**Study Termini Alternatives which resulted from the Pre-AA Process will be carried through Tier I**

Summary of Measurement Criteria
CTC M. Alignment

Criteria	Measure	South of Mall	North of Mall
Promote Desired Land Use and Development			
Service to Activity Centers	Current and Planned Land Use Context	Direct access to CCC/OIT, Aquatic Center on Harmony Road	Closer to CTC public facilities
Walk Market Area Data	Vacant and Redevelopable Acres (Residential/Commercial/Industrial):		
	Within 5 minute walk of LRT stations		
	Sunnyside Terminus	6 / 30 / 0	10 / 16 / 0
	93rd Ave Town Center Area Terminus	1 / 33 / 0	5 / 19 / 0
	Between 5 & 10 min. walk of LRT stations		
	Sunnyside Terminus	76 / 191 / 77	60 / 52 / 40
	93rd Ave Town Center Area Terminus	18 / 73 / 41	36 / 87 / 44
	Households/Employment:		
	Within 5 minute walk of LRT stations		
	Hwy. 212/224	400 / 4,340	860 / 3,400
	Sunnyside Terminus	1,120 / 5820	1,930 / 4,980
	93rd Ave Town Center Area Terminus	390 / 3,820	840 / 2,870
	Between 5 & 10 min. walk of LRT stations		
	Hwy. 212/224	1,000 / 7,350	2,130 / 9,510
	Sunnyside Terminus	1,450 / 7,680	2,340 / 6,990
	93rd Ave Town Center Area Terminus	840 / 6,040	1,980 / 8,270
Land Use Policies	Local Jurisdiction's Policies County/State/Regional Policies		Greater opportunity for future transit oriented development
Transit Ridership			
Ridership	Walk Market LRT Ridership Potential (Hwy. 212/224/ Sunnyside/ 93rd / 84th)	1,340 / 1,970 / 1,180 / 940	1,210 / 1,980 / 1,060 / N/A
	LRT Travel Time (minutes:seconds) (Hwy. 212/224 / Sunnyside / 93rd / 84th)	7:53 / 6:22 / 4:55 / 3:10	8:55 / 8:00 / 5:57 /N/A
	LRT Ridership Impacts from Run Time Differences (Hwy. 212/224 / Sunnyside / 93rd / 84th)	0 / 0 / 0 / 0	-70 / -110 / -70 / N/A
	Net LRT Segment Boardings (Hwy. 212/224 / Sunnyside / 93rd / 84th)	1,340 / 1,970 / 1,180 / 940	1,140 / 1,870 / 990 /N/A
Reliability	Percentage of Segment within Exclusive ROW At-grade Crossings	97-99%	96-99%
Transferability	Quality of Bus Service/LRT Transfer	Less auto/bus conflicts	Existing Transit Center location

Criteria	Measure	South of Mall	North of Mall
Fiscal Stability and Efficiency			
Costs (in millions of $)	YOE Capital Costs		
	Hwy. 212/224 Terminus	$271	$307
	Sunnyside Terminus	$181	$202
	93rd Ave Town Center Area Terminus	$147	$183
(From lowest cost design option with the same terminus))	YOE Difference in Capital Costs [1]		
	Hwy. 212/224 Terminus	$0	$36
	Sunnyside Terminus	$0	$21
	93rd Ave Town Center Area Terminus	$0	$36
	84th Ave CTC Mall Terminus	N/A	N/A
	Difference in Annual O&M (1994$)[1]		
	Hwy. 212/224 Terminus	$0	$0.25
	Sunnyside Terminus	$0	$0.45
	93rd Ave Town Center Area Terminus	$0	$0.25
	84th Ave CTC Mall Terminus	N/A	N/A
Comparative Ratio [2]	Ratio of Annual Cost and Ridership		
	Hwy. 212/224 Terminus	21.3	24.4
	Sunnyside Terminus	14.1	16.7
	93rd Ave Town Center Area Terminus	11.9	14.9
	84th Ave CTC Mall Terminus	7.3	N/A
Engineering Efficiency			
Design Considerations	Level of Engineering Risk or Construction Issues	More Construction impacts to businesses; bridge/berm on north side of Sunnyside from 82nd up to 97th	82nd Avenue bridge, I-5 Bridge, Sunnyside Bridge
Environmental Sensitivity			
Displacements	Residential/Commercial Bldgs./Commercial Units		
	Sunnyside Terminus	31 / 6 / 6	74 / 3 / 3
	93rd Ave Town Center Area Terminus	17 / 6 / 6	72 / 9 / 15
	84th Ave CTC Mall Terminus	27 / 4 / 4	N/A
Neighborhoods	Integration of LRT Service in the Community	Affects south of Southgate Village area	Affects north/east portion of Southgate Village area
Visual	Potential Impacts on Aesthetics of an Area	Structure at Mall/Sunnyside Road	
Noise and Vibration	Potentially Sensitive Receptors		Some residential
Traffic	Traffic Impact Assessment		2 gate crossings of mall traffic

Note: All costs are in millions. Capital costs are for year of expenditure (YOE). Operating and Maintenance (O&M) costs are in 1994 dollars.

[1] Difference from the lowest cost design option. A zero indicates that option as the low cost option.

[2] Comparative ratio includes *LRT Segment Boardings* plus the following bus transfers to LRT: 1) 930 bus transfer access trips for the Highway 212/224 termini - South of Mall design option; 2) 1,100 bus transfer access trips for Highway 212/224 termini - North of Mall design option; 3) 1,070 for 93rd Avenue, Town Center Area terminus - South of Mall design option; 4) 1,240 for 93rd Avenue Town Center Area terminus - North of Mall design option; 5) 380 bus transfer access trips for the Sunnyside terminus - South and North of Mall design option; and 6) 1,310 bus transfer access trips for 84th Avenue/CTC terminus.

Summary of Measurement Criteria
Southern [illegible]minus Options

Criteria	Measure	Hwy. 212/224 Terminus	Sunnyside Terminus	93rd Avenue Town Center Area Terminus	84th Avenue CTC Terminus
Promote Desired Land Use and Development					
Service to Activity Centers	Current and Planned Land Use Context	Terminus located in commercial industrial area	Terminus located near residential/ commercial/medical uses	Terminus located near office/ commercial uses	Does not serve all of Regional Center
Walk Market Area Data	Vacant and Redevelopable Acres (Residential/Commercial/Industrial):				
	Within 5 minute walk of LRT stations	0-4 / 27-40 / 2	0-11 / 16-30 / 0	0-5 / 19-33 / 0	N/A
	Between 5 & 10 min. walk of LRT stations	5-34 / 97-109 / 65-78	20-45 / 52-191 / 40-77	2-32 / 87-73 / 0-1	
	Households/Employment:				
	Within 5 minute walk of LRT stations				
	South of Mall	400 / 4,340	1,120 / 5,820	390 / 3,820	390 / 2,930
	North of Mall	860 / 3,400	1,930 / 4,980	840 / 2,870	
	Between 5 & 10 min. walk of LRT stations				
	South of Mall	1,000 / 7,350	1,450 / 7,680	840 / 6,040	N/A
	North of Mal	2,130 / 9,510	2,340 / 6,990	1,980 / 8,270	
Land Use Policies	Local Jurisdiction's Policies County/State/Regional Policies				
Transit Ridership					
Ridership	Walk Market LRT Ridership Potential				
	South of Mall	1,340	1,970	1,180	940
	North of Mall	1,210	1,980	1,060	N/A
	LRT Travel Time (minutes:seconds)				
	South of Mall	7:53	6:22	4:55	3:10
	North of Mall	8:55	8:00	5:57	N/A
	LRT Ridership Impacts from Run Time Differences (from North of Mall LRT Ridership)	-70	-110	-70	N/A
	Net LRT Segment Boardings				
	South of Mall	1,340	1,970	1,180	940
	North of Mall	1,140	1,870	990	N/A
Reliability	Percentage of Segment within Exclusive ROW	98%	96%	97%	98%
	At-grade Crossings	5-11	7-13	4-10	2
Transferability	Quality of Bus Service/LRT Transfer	No differences between options	No differences between options	No differences between options	No differences between options

Criteria	Measure	Hwy. 212/224 Terminus	Sunnyside Terminus	93rd Avenue Town Center Area Terminus	84th Avenue CTC Terminus
Fiscal Stability and Efficiency					
Costs (in millions of $)	YOE Capital Costs				
	South of Mall	$271	$181	$147	$89
	North of Mall	$307	$207	$183	N/A
(From lowest cost design option with the same terminus)	YOE Difference in Capital Cost [1]	$182 - $219	$92 -$113	$58 - 94	0
	Difference in Annual O&M (1994$)[1]	$1.20 / $1.46	$0.83 / $1.28	$0.45 - $0.71	$0.00
Comparative Ratio [2]	Ratio of Annual Cost and Ridership				
	South of Mall	21.3	14.1	11.9	7.3
	North of Mall	24.4	16.7	14.9	N/A
Engineering Efficiency					
Design Considerations	Level of Engineering Risk or Construction Issues	New underpass of I-205, wetlands, construction impacts on traffic	Bridge of I-205, construction impacts on traffic	Construction impacts on traffic	
Environmental Sensitivity					
Displacements	Residential/Commercial Units	23-72 / 11-15	31-74 / 3-6	17-72 / 6-15	4 / 27
Neighborhoods	Integration of LRT Service in the Community		Direct service to Sunnyside Area		
Noise and Vibration	Potentially Sensitive Receptors	Precision Castparts	Kaiser/Sunnyside		
Ecosystems	Potential Impacts on the Natural Environment	Mt. Scott and Dean Creek			Phillips Creek and CTC detention pond

Note: All costs are in millions. Capital costs are for year of expenditure (YOE). Operating and Maintenance (O&M) costs are in 1994 dollars.

[1] Difference from the lowest cost design option with same central Milwaukie alignment. A zero indicates that option as the low cost option.

[2] Comparative ratio includes *LRT Segment Boardings* plus the following bus transfers to LRT: 1) 930 bus transfer access trips for the Highway 212/224 termini - South of Mall design option; 2) 1,100 bus transfer access trips for Highway 212/224 termini - North of Mall design option; 3) 1,070 for 93rd Avenue Town Center Area Terminus - South of Mall design option; 4) 1,240 for 93rd Avenue Town Center Area Terminus - North of Mall design option; 5) 380 bus transfer access trips for the Sunnyside terminus - South and North of Mall design options, and 6) 1,310 bus transfer access trips for 84th Avenue CTC Terminus.

Summary of Measurement Criteria
Highwa. 224 Segment

Criteria	Measure	Railroad Ave.	North of Hwy. 224	South of Hwy. 224
Promote Desired Land Use and Development				
Service to Activity Centers	Current and Planned Land Use Context	Near to residential and industrial	Adjacent to industrial/ commercial	Adjacent to residential
Walk Market Area Data	Vacant and Redevelopable Acres (Residential/Commercial/Industrial):			
	Within 5 minute walk of LRT stations	6 / 2 / 15	6 / 2 / 17	8 / 1 / 12
	Between 5 & 10 min. walk of LRT stations	41 / 9 / 22	52 / 9 / 27	50 / 11 / 28
	Households/Employment (2015):			
	Within 5 minute walk of LRT stations	500 / 500	460 / 320	500/ 370
	Between 5 & 10 min. walk of LRT stations	1,490 / 2,710	1,520 / 3,150	1,490 / 3,090
Land Use Policies	Local Jurisdiction's Policies	No significant differences		
	County/State/Regional Policies	No significant differences		
Transit Ridership		3 stations	3 stations	3 stations
Ridership	Walk Market LRT Ridership Potential	400	340	370
	LRT Travel Time (minutes:seconds)	3:33	3:41	3:52
	LRT Ridership Impacts from Run Time Differences	0	0	0
	Net LRT Segment Boardings	400	340	370
Reliability	Percentage of Segment within Exclusive ROW	99%	99%	98%
	At-grade Crossings	2	4	5
Transferability	Quality of Bus Service/LRT Transfer	No significant differences	No significant differences	No significant differences

Criteria	Measure	Railroad Ave.	North of Hwy. 224	South of Hwy. 224
Fiscal Stability and Efficiency				
Costs (in millions of $)	YOE Capital Costs	$189	$212	$197
	YOE Difference in Capital Costs [1]	$0	$23	$8
	Difference in Annual O&M (1994$)[1]	$0	$0	$0
Comparative Ratio	Ratio of Annual Cost and Ridership	80.9	106.5	91.3
Engineering Efficiency				
Design Considerations	Level of Engineering Risk or Construction Issues	Construction adjacent to SP Main Line	Wetlands, impacts to Hwy. 224	Retaining walls, impacts to Hwy. 224
Environmental Sensitivity				
Displacements	Residential Units/Commercial Buildings/Commercial Units	71 / 5 / 5	46 / 11 / 11	85 / 3 / 6
Neighborhoods	Integration of LRT Service in the Community			
Visual	Potential Impacts on Aesthetics of an Area	Structure near residential area	None identified	None identified
Noise and Vibration	Potentially Sensitive Receptors	No potential receptors	Some potential receptors	Some potential receptors
Ecosystems	Potential Impacts on the Natural Environment	Minimal	Wetlands	Minimal
Hazardous Materials	Potential Hazardous Materials Risk	Confirmed release at Catellus Site	None identified	None identified
Historic	Number of Potential Impacts on Historic and Cultural Resources	2	0	0
Parks	Potential Impacts to Parklands	Campbell School Playground		
Traffic	Traffic Impact Assessment		No significant differences	No significant differences

Note: All costs are in millions. Capital costs are for year of expenditure (YOE). Operating and Maintenance (O&M) costs are in 1994 dollars.

[1] Difference from the lowest cost design option connecting to the same Central Milwaukie alignment. A zero indicates that option as the low cost option.

Summary of Measurement Criteria
Milwa[illegible]e Segment

Criteria	Measure	Washington to 21st/McLoughlin	Washington to East of SP Branch Line	Monroe St. to 21st/McLoughlin	Monroe St. to East of SP Branch Line
Promote Desired Land Use and Development					
Service to Activity Centers	Current and Planned Land Use Context	Residential/Commercial	Residential/Commercial	Residential/Commercial	Residential/Commercial
Walk Market Area Data	Vacant and Redevelopable Acres (Residential/Commercial/Industrial):				
	Within 5 minute walk of LRT stations	1-2 / 8-9 / 0	3 / 6 / 0	1 / 9 / 0	3 / 3 / 0
	Between 5 & 10 min. walk of LRT stations	7-11 / 17-21 / 0	8 / 26 / 0	7 / 19 / 0	6 / 25 / 0
	Households/Employment (2015):				
	Within 5 minute walk of LRT stations	170-200 / 550	190 /580	170 / 550	200 / 610
	Between 5 & 10 min. walk of LRT stations	1,025-1,160 / 1,230-1,250	970 / 1,170	1,030 / 1,250	960 / 1,140
Land Use Policies	Local Jurisdiction's Policies County/State/Regional Policies	Direct CBD service; Central to Regional Center	Edge of CBD service; Central to Regional Center	Direct CBD service; Central to Regional Center	Edge of CBD service; Central to Regional Center
Transit Ridership					
Ridership	Walk Market LRT Ridership Potential	760	790	760	810
	LRT Travel Time (minutes:seconds)	6:04	5:12	4:36	4:02
	LRT Ridership Impacts from Run Time Differences	-470	-360	-280	-210
	Net LRT Segment Boardings	290	430	480	600
Reliability	Percentage of Segment within Exclusive ROW	58%	49%	91%	88%
	At-grade Crossings (gated/signalized)	5	6	8	6
Transferability	Quality of Bus Service/LRT Transfer				
Fiscal Stability and Efficiency					
Costs (in millions of $)	YOE Capital Costs[1]	$227 - 236	$202 - 209	$206 - 216	$185 - 192
	YOE Difference in Capital Costs [2]	$106	$79	$79	$57
	Difference in Annual O&M (1994$) [2]	$0.36	$0.15	$0	$0.19
Comparative Ratio [3]	Ratio of Annual Cost and Ridership	12.2 - 12.6	10.3 - 10.7	10.2 - 10.7	9.1 - 9.4

Criteria	Measure	Harrison to Main St./McLoughlin	Harrison to East of SP Branch Line	Milwaukie Expressway	SP Main Line
Promote Desired Land Use and Development					
Service to Activity Centers	Current and Planned Land Use Context	Residential/Commercial	Residential/Commercial	Residential/Commercial	Industrial/Commercial
Walk Market Area Data	Vacant and Redevelopable Acres (Residential/Commercial/Industrial):				
	Within 5 minute walk of LRT stations	1 / 7 / 0	1 / 3 / 0	1 / 5 / 0	0
	Between 5 & 10 min. walk of LRT stations	1 / 16 / 2	6 / 17 / 4	11 / 22 / 0	0
	Households/Employment (2015):				
	Within 5 minute walk of LRT stations	250 / 420	540 / 200	240 / 370	0
	Within 5 & 10 min. walk of LRT stations	430 / 1,420	510 / 1,630	390 / 1,470	0
Land Use Policies	Local Jurisdiction's Policies County/State/Regional Policies	Far edge of CBD service	Far from CBD	Far from CBD	Does not serve CBD; edge of regional center
Transit Ridership					
Ridership	Walk Market LRT Ridership Potential	750	870	720	350
	LRT Travel Time (minutes:seconds)	4:55	4:30	4:09	2:32
	LRT Ridership Impacts from Run Time Differences	-325	-265	-225	0
	Net LRT Segment Boardings	425	605	495	350
Reliability	Percentage of Segment within Exclusive ROW	93%	93%	99%	99%
	At-grade Crossings	3	3	1	1
Transferability	Quality of Bus Service/LRT Transfer				
Fiscal Stability and Efficiency					
Costs (in millions of $)	YOE Capital Costs [1]	$210 - 214	$171 - 178	$183 -192	$128 - 139
	YOE Difference in Capital Costs [2]	$82	$43	$56	$0
	Difference in Annual O&M from (1994$) [2]	$0.71	$0.84	$0.62	$0.98
Comparative Ratio [3]	Ratio of Annual Cost and Ridership	11.2 - 11.4	9.1 - 9.4	9.7 - 10.1	8.4 - 9.0

Milwaukie Segment (cont.)

Criteria	Measure	Washington to 21st/McLoughlin	Washington to East of SP Branch Line	Monroe St. to 21st/McLoughlin	Monroe St. to East of SP Branch Line
Engineering Efficiency					
Design Considerations	Level of Engineering Risk or Construction Issues	Steep grades, CBD construction impacts; blind tunnel under SP	CBD construction impacts	Steep grades, CBD construction impacts; tunnel under SP	CBD Construction impacts
Environmental Sensitivity					
Displacements	Residential Units/Commercial Units	3-9 / 37-49	5-9 / 37-48	11-18 / 21-22	64-70 / 18-19
Neighborhoods	Integration of LRT Service in the Community				
Visual	Potential Impacts on Aesthetics of an Area	SP branch line undercrossing		SP branch line undercrossing	
Noise and Vibration	Potentially Sensitive Receptors	Several potential sensitive receptors with all downtown options.			
Historic	Number of Potential Impacts on Historic and Cultural Resources	5	1	7	4
Parks	Potential Impacts to Parklands	Scott Park		Scott Park	
Traffic	Traffic Impact Assessment	Mixed traffic	Mixed traffic		

Note: All costs are in millions. Capital costs are for year of expenditure (YOE). Operating and Maintenance (O&M) costs are in 1994 dollars.

[1] The range of capital costs represents the difference in the cost of connecting the design option to the three different design options in the Railroad Avenue/Highway 224 segment.

[2] Difference from the lowest cost design option connecting to the Railroad Avenue design option. A zero indicates that option as the low cost option.

[3] The daily LRT ridership used to develop the *comparative ratio* includes an additional 390 bus transfer trips with the SP Main Line design option. Also, the weekday LRT ridership for the downtown Milwaukie design options includes an additional 3,000 bus transfer from buses south of Milwaukie, while the SP Main Line option includes an additional 2,790 bus transfers from buses south of Milwaukie.

Criteria	Measure	Harrison to Main St./McLoughlin	Harrison to East of SP Branch Line	Milwaukie Expressway	SP Main Line
Engineering Efficiency					
Design Considerations	Level of Engineering Risk or Construction Issues	CBD Construction impacts, long bridge		Long bridge	Negotiating with railroad
Environmental Sensitivity					
Displacements	Residential Units/Commercial Units	21-26 / 23-25	20-23 / 18-21	1-7 / 19-27	0-4 / 18
Neighborhoods	Integration of LRT Service in the Community				
Visual	Potential Impacts on Aesthetics of an Area	Bridge structure in downtown			
Noise and Vibration	Potentially Sensitive Receptors	Several potential receptors in downtown area		Few potential receptors	Few potential receptors
Historic	Number of Potential Impacts on Historic and Cultural Resources	2	1	1	0
Parks	Potential Impacts to Parklands	Scott Park			
Traffic	Traffic Impact Assessment	Regional collector	Regional collector		

Note: All costs are in millions. Capital costs are for year of expenditure (YOE). Operating and Maintenance (O&M) costs are in 1994 dollars.

[1] The range of capital costs represents the difference in the cost of connecting the design option to the three different design options in the Railroad Avenue/Highway 224 segment.

[2] Difference from the lowest cost design option connecting to the Railroad Avenue design option. A zero indicates that option as the low cost option.

[3] The daily LRT ridership used to develop the *comparative ratio* includes an additional 390 bus transfer trips with the SP Main Line design option. Also, the weekday LRT ridership for the downtown Milwaukie design options includes an additional 3,000 bus transfer from buses south of Milwaukie, while the SP Main Line option includes an additional 2,790 bus transfers from buses south of Milwaukie.

Summary of Measurement Criteria
Eastside Conn[illegible]ion Design Options

Criteria	Measure	PTC/McLoughlin	East Brooklyn Yards	West Brooklyn Yards
Promote Desired Land Use and Development				
Service to Activity Centers	Current and Planned Land Use Context	Serves Brooklyn neighborhood and industrial area	Serves Brooklyn and HAND neighborhood & industrial area	Serves Brooklyn and HAND neighborhood & industrial area
Walk Market Area Data	Vacant and Redevelopable Acres (Residential/Commercial/Industrial):			
	Within 5 minute walk of LRT stations	4 / 10 / 25	4 / 5 / 44	4 / 6 / 40
	Between 5 & 10 min. walk of LRT stations			
	Households/Employment (2015):			
	Within 5 minute walk of LRT stations	900 / 2,430	680 / 7,030	695 / 6,540
	Between 5 & 10 min. walk of LRT stations	1,780/ 7,390	6,330/ 11,460	3,760/ 10,370
Land Use Policies	Local Jurisdiction's Policies			
	County/State/Regional Policies			
Transit Ridership		3 stations	3 stations	3 stations
Ridership	Walk Market LRT Ridership Potential	1,990	3,570	3,400
	LRT Travel Time (minutes:seconds)	6:30	6:17	6:25
	LRT Ridership Impacts from Run Time Differences	0	0	0
	Net LRT Segment Boardings	1,990	3,570	3,400
Reliability	Percentage of Segment within Exclusive ROW	99%	100%	99%
	At-grade Crossings	1	0	3
Transferability	Quality of Bus Service/LRT Transfer			

Criteria	Measure	PTC/McLoughlin	East Brooklyn Yards	West Brooklyn Yards
Fiscal Stability and Efficiency				
Costs (in millions of $)	YOE Capital Costs	$211	$279	$237
	YOE Difference in Capital Costs [1]	$0	$68	$26
	Difference in Annual O&M (1994$)[1]	N/A	N/A	N/A
Comparative Ratio	Ratio of Annual Cost and Ridership	19.2	13.5	12.3
Engineering Efficiency				
Design Considerations	Level of Engineering Risk or Construction Issues	Questionable fill near OMSI	Questionable fill near OMSI, negotiations with railroads	Questionable fill near OMSI, negotiations with railroads
Environmental Sensitivity				
Displacements	Residential Units/Commercial Buildings/ Commercial Units	28 / 11 / 11 13 / 10 / 10 sub-option	16 / 47 / 49	1 / 38 / 53
Neighborhoods	Integration of LRT Service in the Community	Opposition to Center St. Station		Neighborhood support
Noise and Vibration	Potentially Sensitive Receptors	Residences on east side of McLoughlin		
Ecosystems	Potential Impacts on the Natural Environment	Willamette River edge		
Hazardous Materials	Potential Hazardous Materials Risk	Industrial area	Industrial area	Industrial area
Historic	Number of Potential Impacts on Historic and Cultural Resources	7	3	5
Parks	Potential Impacts to Parklands	Greenway, Riverside Park, PTC Trail		
Traffic	Traffic Impact Assessment	Minor	Minor	Minor

Note: All costs are in millions. Capital costs are for year of expenditure (YOE). Operating and Maintenance (O&M) costs are in 1994 dollars.
[1] Difference from the lowest cost design option. A zero indicates that option as the low cost option.

Summary of Measurement Criteria
Caruthers River Crossings

Criteria	Measure	Caruthers/Marquam	Caruthers Modified	Caruthers	Caruthers "S"
Promote Desired Land Use and Development					
Service to Activity Centers	Current and Planned Land Use Context	Serves Riverplace and OMSI	Serves Riverplace and OMSI	Serves Riverplace and OMSI	Serves Riverplace, OMSI and North Macadam
Walk Market Area Data	Vacant and Redevelopable Acres (Residential/Commercial/Industrial):				
	Within 5 minute walk of LRT stations	N/A	N/A	N/A	
	Between 5 & 10 min. walk of LRT stations	N/A	N/A	N/A	
	Households/Employment (2015):				
	Within 5 minute walk of LRT stations	N/A	N/A	N/A	690 / 5,050
	Between 5 & 10 min. walk of LRT stations				
Land Use Policies	Local Jurisdiction's Policies County/State/Regional Policies				
Transit Ridership					1 station
Ridership [3]	Walk Market LRT Ridership Potential	N/A	N/A	N/A	2,000
	LRT Travel Time (minutes:seconds)	1:57	1:43	2:00	3:09
	LRT Ridership Impacts from Run Time Differences	N/A	N/A	N/A	-400
	Net LRT Segment Boardings	N/A	N/A	N/A	1,600 [4]
Reliability	Percentage of Segment within Exclusive ROW	99%	100%	98%	98%
	At-grade Crossings	1	1	3	3
Transferability	Quality of Bus Service/LRT Transfer	same	same	same	same
Fiscal Stability and Efficiency					
Costs (in millions of $)	YOE Capital Costs [1]	$132	$141	$133	$159
	YOE Difference in Capital Costs [2]	$0	$9	$1	$27
	Difference in Annual O&M (1994$)[2]	$0	$0	$0	$0.37
Comparative Ratio	Ratio of Annual Cost and Ridership	N/A	N/A	N/A	N/A

Criteria	Measure	Caruthers/Marquam	Caruthers Modified	Caruthers	Caruthers "S"
Engineering Efficiency					
Design Considerations	Level of Engineering Risk or Construction Issues	Geologic/Seismic	Geologic/Seismic	Geologic	Geologic
Environmental Sensitivity					
Displacements	Residential Units/Commercial Buildings/ Commercial Units	0	1	0	0
Visual	Potential Impacts on Aesthetics of an Area	New bridge	New bridge	New bridge	Impacts view from both banks
Ecosystems	Potential Impacts on the Natural Environment	Piers in River	Piers in River	Piers in River	More piers in River
Hazardous Materials	Potential Hazardous Materials sites			Known site	Known site
Historic	Number of Potential Impacts on Historic and Cultural Resources	2	2	2	3
Parks	Potential Impacts to Parklands	Willamette Greenway	Willamette Greenway	Willamette Greenway	Willamette Greenway
Traffic	Traffic Impact Assessment	Grade-crossing at Moody	Grade-crossing at Moody	Grade crossing at Moody and Sheridan	Grade crossing at Moody and Sheridan

Note: All costs are in millions. Capital costs are for year of expenditure (YOE). Operating and Maintenance (O&M) costs are in 1994 dollars.

[1] The capital costs for these bridge options assume a concrete segmental bridge type. Other bridge types may cost more; for example, a through truss bridge would cost $18M more for Caruthers "S" and about $15M more for the other options.

[2] Difference from the lowest cost design option. A zero indicates that option as the low cost option.

[3] *LRT segment boardings* for the Caruthers "S" option reflects the increase in South/North LRT riders over the other two options which would require riders to board buses at this location and transfer to South/North LRT at a downtown station. Without accounting for bus transfers to LRT for the other two options, the Caruthers "S" would have approximately 2,600 *LRT segment boardings*.

[4] *LRT segment boardings* may be over estimated because the Caruthers "S" option may limit the development potential of the property between the Ross Island and Marquam Bridges which could lead to fewer residents and employees being located within walking distance of the LRT station.

Summary of Measurement Criteria
Ross Island River Crossings

Criteria	Measure	South and Parallel to Ross Island Bridge	North Ross Island	Mid Ross Island
Promote Desired Land Use and Development				
Service to Activity Centers	Current and Planned Land Use Context	Serves some of North Macadam redevelopment area	Serves all North Macadam redevelopment area	Serves all North Macadam redevelopment area
Walk Market Area Data	Vacant and Redevelopable Acres (Residential/Commercial/Industrial):			
	Within 5 minute walk of LRT stations	5 / 63 / 13	4 / 86 / 14	1 / 88 / 9
	Between 5 & 10 min. walk of LRT stations	not available	not available	not available
	Households/Employment (2015):			
	Within 5 minute walk of LRT stations	1,550 / 6,440	2,250 / 9,230	1,660 / 10,280
	Between 5 & 10 min. walk of LRT stations	not available	not available	not available
Land Use Policies	Local Jurisdiction's Policies	Less supporting	Supports comp plan densities	Supports comp plan densities
	County/State/Regional Policies	Less supporting	Supports 2040	Supports 2040
Transit Ridership		4 stations	5 stations	4 stations
Ridership	Walk Market LRT Ridership Potential	4,490	6,460	6,440
	LRT Travel Time (minutes:seconds)	7:20	8:00	7:27
	LRT Ridership Impacts from Run Time Differences	0	-200	0
	Net LRT Segment Boardings	4,490	6,260[3]	6,440
Reliability	Percentage of Segment within Exclusive ROW	98%	98%	98%
	At-grade Crossings	3	3	3
Transferability	Quality of Bus Service/LRT Transfer	2 transfer stations	2 transfer stations	3 transfer stations
Fiscal Stability and Efficiency				
Costs (in millions of $)	YOE Capital Costs [1]	$331	$351[4]	$405
	YOE Difference in Capital Costs [2]	$0	$20	$74
	Difference in Annual O&M (1994$)[2]	$0	$0.16	$0
Comparative Ratio	Ratio of Annual Cost and Ridership	12.7	9.7	10.7

Criteria	Measure	South and Parallel to Ross Island Bridge	North Ross Island	Mid Ross Island
Engineering Efficiency				
Design Considerations	Level of Engineering Risk or Construction Issues	Geological, in-water construction limits	Geological, in-water construction limits	Geological, in-water construction limits, conflict with gravel extraction
Environmental Sensitivity				
Displacements	Residential Units/Commercial Buildings/ Commercial Units	58 / 12 / 14 15 / 13 / 15 sub-option	30 / 13 / 15 15 / 14 / 16 sub-option	13 / 17 / 17
Neighborhoods	Integration of LRT Service in the Community			
Visual	Potential Impacts on Aesthetics of an Area	New bridge	New bridge	New bridge
Noise and Vibration	Potentially Sensitive Receptors	Most: East side of McLoughlin	More: East side of McLoughlin	Few
Ecosystems	Potential Impacts on the Natural Environment	River, but more piers	River, Island	River, Island, Great Blue Heron
Hazardous Materials	Potential Hazardous Materials Risk	Known unremediated sites	Potential along Moody Ave.	Potential along Moody Ave.
Historic	Number of Potential Impacts on Historic and Cultural Resources	3	3	4
Parks	Potential Impacts to Parklands	Willamette Greenway and Riverside Park	Willamette Greenway	Willamette Greenway
Traffic	Traffic Impact Assessment	Moody Ave., Franklin St.	Moody Ave., Center St.	Potential impact on Bancroft

Note: All costs are in millions. Capital costs are for year of expenditure (YOE). Operating and Maintenance (O&M) costs are in 1994 dollars.

[1] Capital cost assumes a concrete segmental bridge. Other bridge types may cost more, for example, a cable stayed (North and Mid Ross Island) or through truss (South Parallel) bridge type would cost between $18 to $20 million more.

[2] Difference from the lowest cost design option. A zero indicates that option as the low cost option.

[3] The West of McLoughlin sub-option would eliminate the Center Street station resulting in a decrease in segment LRT boardings to 6,030.

[4] The West of McLoughlin sub-option would cost $354M (YOE).

Summary of Measurement Criteria
Steel B ,ge to Kaiser

Criteria	Measure	Wheeler/Flint Station	Wheeler/Russell Station	East I-5/Kerby Station	West I-5/Graham Station
Promote Desired Land Use and Development					
Service to Activity Centers	Current and Planned Land Use Context	Flint Station serves high density residential	Russell Station serves high density residential	Kerby Station serves center of Emanuel Campus	Graham Station serves industrial sanctuary
Walk Market Area Data	Vacant and Redevelopable Acres (Residential/Commercial/Industrial):				
	Within 5 minute walk of LRT stations	2 / 13 / 7	1 / 13 / 10	2 / 16 / 12	2 / 13 / 27
	Between 5 & 10 min. walk of LRT stations	43 / 37 / 50	54 / 43 / 44	45 / 33 / 35	45 / 36 / 23
	Households/Employment (2015):				
	Within 5 minute walk of LRT stations	340 / 7,400	290 / 7,850	320 / 9,240	210 / 7,920
	Between 5 & 10 min. walk of LRT stations	940 / 3,150	950 / 2,400	1,380 / 8,260	860 / 8,080
Land Use Policies	Local Jurisdiction's Policies	Identified in Albina Community Plan	Identified in Albina Community Plan	Not included in Albina Community Plan	Not included in Albina Community Plan
Transit Ridership		3 stations	3 stations	3 stations	3 stations
Ridership	Walk Market LRT Ridership Potential	2,580	2,680	3,140	2,640
	LRT Travel Time (minutes:seconds)	6:25	6:33	5:16	4:28
	LRT Ridership Impacts from Run Time Differences	-780	-780	-270	0
	Net LRT Segment Boardings	1,800	1,900	2,870	2,640
Reliability	Percentage of Segment within Exclusive ROW	51%	58%	86%	95%
	At-grade Crossings	12	8	5	6
Transferability	Quality of Bus Service/LRT Transfer	Transfers at Rose Quarter Transit Ctr.	Transfers at Rose Quarter Transit Ctr.	Transfers at Rose Quarter Transit Ctr.	Transfers at Rose Quarter Transit Ctr.
Fiscal Stability and Efficiency					
Costs (in millions of $)	YOE Capital Costs	$169	$168	$146	$145
	YOE Difference in Capital Costs [1]	$24	$23	$1	$0
	Difference in Annual O&M (1994$)[1]	$0.49	$0.52	$0.20	$0
Comparative Ratio	Ratio of Annual Cost and Ridership	18.1	17.0	9.4	9.9

Criteria	Measure	Wheeler/Flint Station	Wheeler/Russell Station	East I-5/Kerby Station	West I-5/Graham Station
Engineering Efficiency					
Design Considerations	Level of Engineering Risk or Construction Issues	Coordination with I-5 improvements, narrow ROW on Wheeler, difficult access to I-5 alignment	Coordination with I-5 improvements, narrow ROW on Wheeler	Coordination with I-5 improvements	Coordination with I-5 improvements, difficult access to I-5 alignment
Environmental Sensitivity					
Displacements	Residential Units/Commercial Buildings/ Commercial Units	8 / 14 / 15	15 / 12 / 18	7 / 9 / 10	3 / 12 / 74
Noise and Vibration	Potentially Sensitive Receptors	Tubman Middle School, Emanuel, Kaiser	Tubman Middle School, Emanuel, Kaiser	Emanuel, Kaiser	Kaiser
Historic	Number of Potential Impacts on Historic and Cultural Resources	4	4	5	6
Parks	Potential Impacts to Parklands	Lillis Albina Park	Lillis Albina Park	Lillis Albina Park	none
Traffic	Traffic Impact Assessment	Arena parking access, at-grade crossing of Broadway/Weidler	Arena parking access, at-grade crossing of Broadway/Weidler	none	none

Note: All costs are in millions. Capital costs are for year of expenditure (YOE). Operating and Maintenance (O&M) costs are in 1994 dollars.
[1] Difference from the lowest cost design option. A zero indicates that option as the low cost option.

Summary of Measurement Criteria
Kaiser / Expo Center

Criteria	Measure	All I-5 Alternative	N. Killingsworth Crossover	N. Portland Blvd. Crossover	Kenton Area Crossover
Promote Desired Land Use and Development					
Service to Activity Centers	Current and Planned Land Use Context	No direct service to Kenton Business District	Direct access to Kenton Business District	Direct access to Kenton Business District	Direct access to Kenton Business District
Walk Market Area Data	Vacant and Redevelopable Acres (Residential/Commercial/Industrial)				
	Within 5 minute walk of LRT stations	16 / 16 / 4	24 / 23 / 5	30 / 23 / 4	26 / 19 / 26
	Between 5 & 10 min. walk of LRT stations	45 / 13 / 5	48 / 7 / 5	44 / 7 / 6	44 / 11 / 6
	Households/Employment (2015):				
	Within 5 minute walk of LRT stations	1,600 / 2,760	2,260 / 3,320	2,210 / 3,520	1,780 / 3,370
	Between 5 & 10 min. walk of LRT stations	3,330 / 2,950	3,350 / 2,340	3,240 / 2,450	3,460 / 2,470
Land Use Policies	Local Jurisdiction's Policies	Identified in Albina Community Plan	Consistent with Albina Community Plan	Consistent with Albina Community Plan	Consistent with Albina Community Plan
Transit Ridership		6 stations	6 stations	6 stations	6 stations
Ridership	Walk Market LRT Ridership Potential	2,110	2,790	2,820	2,430
	LRT Travel Time (minutes:seconds)	11:20	12:32	12:24	12:28
	LRT Ridership Impacts from Run Time Differences	0	-550	-550	-550
	Net LRT Segment Boardings	2,110	2,240	2,270	1,880
Reliability	Percentage of Segment within Exclusive ROW	100%	66%	76%	95%
	At-grade Crossings	10	19	18	16
Transferability	Quality of Bus Service/LRT Transfer	No Kenton transfer	Kenton transfer opportunity	Kenton transfer opportunity	Kenton transfer opportunity
Fiscal Stability and Efficiency					
Costs (in millions of $)	YOE Capital Costs	$374	$434	$410	$402
	YOE Difference in Capital Costs [1]	$0	$60	$36	$28
	Difference in Annual O&M (1994$)[1]	$0	$0.29	$0.29	$0.29
Comparative Ratio	Ratio of Annual Cost and Ridership	31.8	34.4	32.4	38.4

Criteria	Measure	All I-5 Alternative	N. Killingsworth Crossover	N. Portland Blvd. Crossover	Kenton Area Crossover
Engineering Efficiency					
Design Considerations	Level of Engineering Risk or Construction Issues	Neighborhood construction impacts	Tight turns on crossovers	Tight turns on crossovers	Tight turns on crossovers
Environmental Sensitivity					
Displacements	Residential Units/Commercial Units	81 / 5	69 / 16	81 / 16	93 / 17
Noise and Vibration	Potentially Sensitive Receptors	Noise walls are possible	Noise walls are possible in I-5 sections	Noise walls are possible in I-5 sections	Noise walls are possible in I-5 sections
Historic	Number of Potential Impacts on Historic and Cultural Resources		2	0	4
Parks	Potential Impacts to Parklands	Low impact risk	Low impact risk	Low impact risk	Low impact risk
Traffic	Traffic Impact Assessment	Few traffic concerns	Traffic concerns at Crossover and in Kenton	Traffic concerns at Crossover and in Kenton	Traffic concerns at Kenton

Notes: All costs are in millions. Capital costs are for year of expenditure (YOE). Operating and Maintenance (O&M) costs are in 1994 dollars.
[1] Difference from the lowest cost design option. A zero indicates that option as the low cost option.

Summary of Measurement Criteria
Hayden Island

Criteria	Measure	West of I-5 (over ramp)	West of I-5 (under ramp)	Center Avenue	Adjacent to Jantzen Beach Center
Promote Desired Land Use and Development					
Service to Activity Centers	Current and Planned Land Use Context	Retail Commercial	Retail Commercial	Retail Commercial	Retail Commercial
Walk Market Area Data	Vacant and Redevelopable Acres:				
	Within 5 minute walk of LRT stations	N/A	N/A	N/A	N/A
	Between 5 & 10 min. walk of LRT stations	N/A	N/A	N/A	N/A
	Households/Employment (2015):				
	Within 5 minute walk of LRT stations	N/A	N/A	N/A	N/A
	Between 5 & 10 min. walk of LRT stations	N/A	N/A	N/A	N/A
Land Use Policies	Local Jurisdiction's Policies				
	County/State/Regional Policies				
Transit Ridership					
Ridership	Walk Market LRT Ridership Potential	N/A	N/A	N/A	N/A
	LRT Travel Time (minutes:seconds)	4:04	4:31	4:11	4:19
	LRT Ridership Impacts from Run Time Differences	N/A	N/A	N/A	N/A
	Net LRT Segment Boardings	N/A	N/A	N/A	N/A
Reliability	Percentage of Segment within Exclusive ROW	100%	100%	82%	85%
	Number of At-grade Crossings	0	0	2	2
Transferability	Quality of Bus Service/LRT Transfer	good	good	good	good
Fiscal Stability and Efficiency					
Costs (in millions of $)	YOE Capital Costs	$95	$89	$81	$83-$89
	YOE Difference in Capital Costs [1]	$14	$8	$0	$2-$8
	Difference in Annual O&M (1994$)[1]	$0	$0	$0	$0
Comparative Ratio	Ratio of Annual Cost and Ridership	N/A	N/A	N/A	N/A

Criteria	Measure	West of I-5 (over ramp)	West of I-5 (under ramp)	Center Avenue	Adjacent to Jantzen Beach Center
Engineering Efficiency					
Design Considerations	Level of Engineering Risk or Construction Issues	Harbor bridge and bridges over roadways; bridge over operating ramps	Harbor bridge and bridges over roadways; tunnel under operating ramps	Harbor bridge and bridges over roadways; bridge over major intersection	Harbor bridge and bridges over roadways; bridge over major intersection
Environmental Sensitivity					
Displacements	Residential Units/Commercial Buildings/ Commercial Units	12 / 7 / 14	12 / 7 / 14	17 / 3 / 3	17 / 3 / 3
Neighborhoods	Integration of LRT Service in the Community	Elevated station has difficult access		Divides floating home community	Divides floating home community
Visual	Potential Impacts on Aesthetics of an Area	Highest impact	Low impact	Moderate impact	Moderate impact
Noise and Vibration	Potentially Sensitive Receptors	Hugs I-5 - away from receptors	Hugs I-5 - away from receptors	Closest to receptors	Closest to receptors
Ecosystems	Potential Impacts on the Natural Environment	Harbor Bridge	Harbor Bridge	Harbor Bridge	Harbor Bridge
Hazardous Materials	Potential Hazardous Materials Risk				
Historic	Number of Potential Impacts on Historic and Cultural Resources	0	0	0	1
Parks	Potential Impacts to Parklands				
Traffic	Traffic Impact Assessment	No impacts	No impacts	Impact to intersection of Center Ave. & ramps	Impacts to mall access and circulation

Note: All costs are in millions. Capital costs are for year of expenditure (YOE). Operating and Maintenance (O&M) costs are in 1994 dollars.
[1] Difference from the lowest cost design option. A zero indicates that option as the low cost option.

Summary of Measurement Criteria
Columbia River Crossing

Criteria	Measure	Low Level Lift Span	Bored Tunnel
Promote Desired Land Use and Development			
Service to Activity Centers	Current and Planned Land Use Context	Would serve Hayden Island and Vancourver CBD	Would serve Hayden Island
Walk Market Area Data	Vacant and Redevelopable Acres:	Would serve Lucky Brewery Redevelopment site	Would miss Lucky Brewery Redevelopment site
Land Use Policies	Local Jurisdiction's Policies	Encourages CDB's development	Misses most of downtown
Transit Ridership			
Ridership	Walk Market LRT Ridership Potential	N/A	N/A
Reliability	Percentage of Segment within Exclusive ROW	100%	100%
	Number of At-grade Crossings	N/A	N/A
Transferability	Quality of Bus Service/LRT Transfer	Serves the transit center	4 blocks from transit center
Fiscal Stability and Efficiency			
Costs (in millions of $)	YOE Capital Costs [1]	$167	$268
	YOE Difference in Capital Costs [2]	$0	$101
	Difference in Annual O&M (1994$) [2]	$0 - 0.16	$0
Comparative Ratio	Ratio of Annual Cost and Ridership	N/A	N/A

Criteria	Measure	Low Level Lift Span	Bored Tunnel
Engineering Efficiency			
Design Considerations	Level of Engineering Risk or Construction Issues	Piers in River; in-water construction	Biological, tunneling, dewatering
Environmental Sensitivity			
Displacements	Residential Units/Commercial Buildings	0 / 1	0 / 4
Neighborhoods	Integration of LRT Service in the Community		
Visual	Potential Impacts on Aesthetics of an Area	New bridge	500' and 470' long portals
Ecosystems	Potential Impacts on the Natural Environment	Piers in River	
Historic	Number of Potential Impacts on Historic and Cultural Resources	4	21

Note: All costs are in millions. Capital costs are for year of expenditure (YOE). Operating and Maintenance (O&M) costs are in 1994 dollars.

[1] Capital cost is for a concrete segmental bridge. Other bridge types could cost more. For example, a bow string design over the full length of the bridge could add up to $60 million (YOE) to the capital costs.

[2] Difference from the lowest cost design option. A zero indicates that option as the low cost option.

Summary of Measurement Criteria
Vancouver CBD to A Hospital/Clark College

Criteria	Measure	Washington Street from River	Columbia Street from River	Double-track on Washington	Washington/Main St. Couplet
Promote Desired Land Use and Development					
Service to Activity Centers	Current and Planned Land Use Context		Could limit development of brewery	Better serves residential areas and office development	
Walk Market Area Data	Vacant and Redevelopable Acres:				
	Within 5 minute walk of LRT stations	N/A	N/A	N/A	N/A
	Between 5 & 10 min. walk of LRT stations	N/A	N/A	N/A	N/A
	Households/Employment (2015):				
	Within 5 minute walk of LRT stations	N/A	N/A	N/A	N/A
	Between 5 & 10 min. walk of LRT stations	N/A	N/A	N/A	N/A
Land Use Policies	Local Jurisdiction's Policies				
	County/State/Regional Policies				
Transit Ridership					
Ridership	Walk Market LRT Ridership Potential				
	LRT Travel Time (minutes:seconds)	N/A	N/A	2:11	3:00
	LRT Ridership Impacts from Run Time Differences	N/A	N/A	0	-250
	Net LRT Segment Boardings				
Reliability	Percentage of Segment within Exclusive ROW				
	At-grade Crossings				
Transferability	Quality of Bus Service/LRT Transfer				
Fiscal Stability and Efficiency					
Costs (in millions of $)	YOE Capital Costs	$34	$31	$56	$87
	YOE Difference in Capital Costs [2]	$3	$0	$0	$31
	Difference in Annual O&M (1994$)[1]	N/A	N/A	$0	$0.22
Comparative Ratio	Ratio of Annual Cost and Ridership	N/A	N/A	N/A	N/A

Criteria	Measure	Washington Street from River	Columbia Street from River	Double-track on Washington	Washington/Main St. Couplet
Engineering Efficiency					
Design Considerations	Level of Engineering Risk or Construction Issues	New opening under railroad	May require widening of existing structure		Higher risk because of impacts to 2 streets; Main St. may be more sensitive to construction impacts
Environmental Sensitivity					
Displacements	Residential Units/Commercial Units			0 / 0	0 / 0
Noise and Vibration	Potentially Sensitive Receptors				Tight turns could result in additional noise
Ecosystems	Potential Impacts on the Natural Environment				
Historic	Number of Potential Impacts on Historic and Cultural Resources			55	59
Parks	Potential Impacts to Parklands		May limit access to waterfront		
Traffic	Traffic Impact Assessment	Potential traffic impacts at 5th & Washington		Supports City proposals to enhance traffic circulation in CBD	Conflicts with future CBD circulation improvements

Note: All costs are in millions. Capital costs are for year of expenditure (YOE). Operating and Maintenance (O&M) costs are in 1994 dollars.

[1] The data in this table represent the portion of this segment between 7th Street and 17th Street. The costs and run times for the portion from 17th Street to VA Hospital/Clark College would be constant for both options.

[2] Difference from the lowest cost design option. A zero indicates that option as the low cost option.

South North
Transit Corridor Study

EXHIBIT B

Downtown Portland Tier I Final Recommendation Report

South/North Steering Group

November 20, 1995

METRO