Testimony submitted by Ruth Scott, speaking for Planning Commission

December 7, 1995

35473

South/North City Council Hearing

Speaking Points for Planning Commission

The Portland City Planning Commission voted to support the South/North Steering Group's design option recommendations The Planning Commission took this action at a hearing held on November 28th

The Planning Commission received extensive public testimony at this hearing as well as at three public workshops held in August and September

The Planning Commission supported the recommendation because they offer the best choices for the City to examine the role of light rail to shape our community to attract new residents and workers, improve livability, become less reliant on the automobile, and promote the use of transit

Specific Alignment Comments

Downtown

The Planning Commission supported light rail on 5th/6th Avenue for the following reasons

- This recommendation best meets the goals of the Downtown Plan, Central City Plan, and the recently adopted Central City Transportation Management Plan.
- 5th/6th Avenue provide for a balanced transportation system in Downtown by concentrating service in the highest density employment corridor
- 5th/6th Avenue provide for the capacity needed for light rail, buses, pedestrians, and automobiles
- 5th/6th Ave would preserve the function of other streets for on-street parking to support businesses, auto access to downtown garages, and accommodate other modes--bicycles and service vehicles

The Planning Commission supports moving some buses off the mall to address the access and circulation needs of the Central City It also supports the Downtown Oversight Committee's recommendation for a Central City Transit Circulation Plan that includes a facility plan that would enhance the role of buses on non-mall streets

South Willamette River Crossings

The Planning Commission supports the recommendation for the Caruthers Crossing and Ross Island Crossing The two choices will offer two contrasting options for shaping the City. The Caruthers option for the DEIS should maximize development opportunities while serving established city neighborhoods The Ross Island option could provide a catalyst for changing an older industrial area to a new mixed-use community as envisioned in the Central City Plan while preserving the natural and scenic resources of Ross Island

The Planning Commission would like the following two issues examined during the next phase of the process:

- Station area urban form, land use issues surrounding each station, especially in Southeast Portland.

- The impacts to the environmental values on Ross Island

North/Northeast Portland

The Planning Commission strongly supports every effort to build light rail to North Portland, while maintaining our regional commitments to build the next light rail to Clackamas County

The Planning Commission endorses locating an at-grade station near Broadway-Weidler

The Planning Commission will like to see more technical information to determine the need for a crossover option

35473

Oregon Pacific
Investment
Development
Company

1800 SW First Avenue
Portland Oregon 97201
503 225-1102

December 7, 1995

City Hall
1220 S W Fifth Avenue
Portland, Oregon 97204

RE South/North Light Rail Alignment

Dear Mayor Katz and Members of the City Council

The South Auditorium District is a unique, revitalized urban neighborhood

For the past 25 years, the city has been committed to creating a vital South Auditorium District Today, this District is home to more than 1,600 employees, 20% of Portland's office space and over 1,000 residential units/hotel rooms Parks, fountains and other pedestrian amenities enhance a thriving urban environment South Auditorium is a positive model of public-private investment in the center city

As the South/North Light Rail alignment decisions are narrowed, the South Auditorium Light Rail Coalition urges the Citizen Advisory Committee to consider some important issues that relate to the people who live and work in the properties we own and manage The key points raised by our Coalition members are as follows

- We support "Recommendation #3" of the Downtown Portland Tier/Final Recommendation Report (November 2, 1995)

  "That convenient, readily accessible service be provided to all Central City districts, including Riverplace, South Auditorium, Portland State University, Central Business District, Old Town/Chinatown and Union Station Station stops at these locations should be established even if central city travel time

for LRT is lengthened" (Page 3 "Recommendations")

- Properly designed, the Harrison Option for the South Entry ("S-1") can provide the best service to the South Auditorium and neighboring districts

- A station location on Harrison provides the best service to the South Auditorium District, the EIS should specifically study this alternative as preferred to a station located on a bridge structure over Harbor Drive (which would serve neither the South Auditorium nor the Riverplace/South Waterfront areas)

- The traffic and circulation assumptions involving the rebuilt Harrison Street, Front and First should be revisited, so that existing properties are not disadvantaged and so that the transit and urban design objectives are not overwhelmed by the dumping of four and five lanes of auto traffic onto Harrison (to accommodate possible development in the South Waterfront area)

Thank you for your consideration and the opportunity to be heard

Sincerely,

OREGON PACIFIC INVESTMENT
DEVELOPMENT COMPANY

Julie S Leuvrey
Vice President

JSL/sda

35473

South Auditorium Light Rail Coalition Members

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Steve Rosenberg
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Portland, Oregon 97201
Phone 274-0526
Fax 274-2334

Revised 10/25/95

1908

35473

Portland City Council Testimony

December 7, 1995

RE S/N Design option narrowing

I will devote my three minutes in attempting to convince you to ask Metro to produce a legitimate Fourth Avenue Subway study

A Fourth Avenue Subway option has never been adequately analyzed A ridiculously inflated, back of the envelop cost estimate created by Tri-Met has been touted as fact and has, up to now, convinced everyone that a subway is not feasible

It is very feasible Other cities in North America have built transit subways at far lower costs than are being projected for this project

For example, Edmonton Alberta, a city with about half the population of Portland, built a small 7.7 mile - 10 station light rail system which includes a 2.9 mile long subway with 6 underground stations The total cost of this system, including a hundred car maintenance facility and 37 LRVs, is $435 million (1994 U.S. dollars)

By the way, this system carries one and ore- half times as many daily passengers as MAX with only half as much track and one third as many stations.

The system is being built in phases Over the last dozen years the original Downtown subway with 2 stations has been extended 2 miles including a light rail-pedestrian-bicycle bridge over the North Saskatchewan River and 4 underground stations. The total cost of this extension including the purchase of 20 light rail cars was $243 million (U S 1994 dollars)

This would be $193 million a mile in the S/N project's YOE dollars, and that includes the rail cars

A Fourth Avenue Subway alignment through Downtown would be only 1 2/3 miles long with about 1 mile in subway Assuming half the per mile subway cost for the surface construction and assuming we could construct subways as efficiently as they do in Edmonton, the total cost of Downtown construction should not exceed $257 million **This is $40 million less than the estimated cost of putting light rail on the Transit Mall.**

Potential construction disruption is another excuse for not further considering a subway option. However, the subway option would impact only 25 Downtown blocks whereas the proposed Mall surface alignment impacts **60 blocks.**

The tangent pile technique employed in Downtown Edmonton for their underground stations allowed the permanent restoration of the surface street **within 6 months** of the start of construction. The soil condition in Downtown Portland allows this same technique to be used here.

6 months or 3 years of disruption, the choice is yours.

Another favorite argument presented by those opposing the subway is that additional north-south capacity is not needed in the future The Barbur Blvd Transit Corridor which now accommodates over twice as many passengers as the Mcloughlin Corridor will, according to some planners, shrink to half of the McLoughlin Corridors ridership in the future. What sea change of events will cause this massive shift of ridership? If the planners think the southwest suburban travel shed which includes Tigard, Sherwood, Tualatin and Wilsonville can be diverted to the Westside Light Rail Line with a future Hwy 217 LRT extension, they are not being realistic Travel time to Downtown would be too great and the Westside Line will not be able to handle that additional demand on its cross mall alignment.

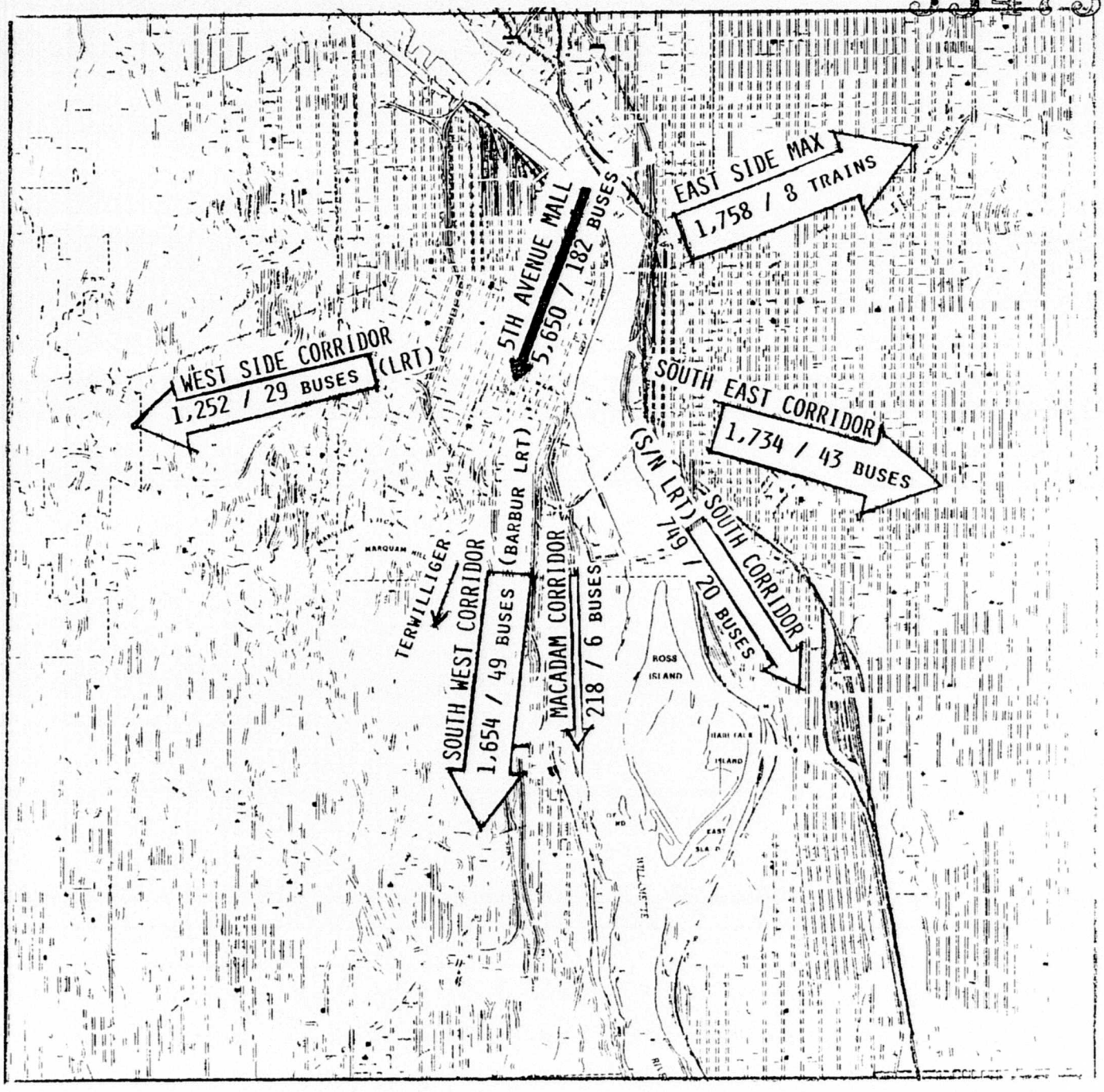
It does not take a genius to realize that more, not less Downtown passenger carrying capacity will be needed in the future. **The proposed surface alignment reduces the Mall's total carrying capacity by 16% to 20% whereas a subway would increase north-south capacity by almost 400%** (8,600 today to 33,200 with a subway)

Finely, some people oppose the subway because they believe it will reduce the vitality of Portland's Downtown streets by reducing pedestrian activity

I challenge anyone to demonstrate where this has happened in any city, anywhere, when a new subway is built. In fact the opposite occurs The speed an convenience of subways attract more people Downtown which results in more not less street activity.

Jim Howell 3325 N E. 45th Avenue Portland OR 97213 (503)384-7182

35473



1994 WEEKDAY PM PEAK HOUR TRANSIT LOADS AND CAPACITY ON 5TH AVENUE MALL AND MAX

By Jim Howell, 284-7182
For AORTA 11-9-95

EDMONTON TRANSIT'S LRT SYSTEM (1994)

35473

I EXISTING LRT SYSTEM (CLAREVIEW TO UNIVERSITY)

- 12 3 km (4 7 km underground including Dudley B Menzies Bridge, 7 6 km surface)
- 37 LRV's
- 10 Stations (6 underground, 4 surface)
- $338 4 million (system cost)
- 36,000 weekday ridership
- Service Frequency 5 minute peak, 10 minute midday
  15 minute evening and Sunday
  10 minute Saturday
- Operating Speed 70 kph maximum posted speed
- 111 staff
- $12 million (1994 operating budget)
- $1 3 million (1994 Capital budget excluding LRT Construction)

II CONSTRUCTION HISTORY

- First segment opened on April 22, 1978
  - 6 9 km of track
  - 14 LRV's
  - 5 Stations (Central - Belvedere)
  - $64 9 million

- Clareview Extension opened in April, 1981
  - 2 2 kms of track
  - 3 LRV'S
  - 1 Station
  - 450 capacity parking lot
  - $9 5 million

- Downtown Extension to Corona opened in 1983
  - 0 8 km of track
  - 20 LRV's
  - 2 Stations (Bay, Corona)
  - $89 6 million

- D L MacDonald Transit Yard opened in December, 1983
  - $28 2 million

- Grandin Extension opened September 1989
  - 0 8 km of track
  - 0 LRV's
  - 1 Station
  - $67 1 million

- University Extension opened August 23, 1992
  - 1 6 km of track (double track to South Portal, then single track to University)
  - 0 LRV's
  - 1 Station
  - $79 1 million

- 2nd track from South Portal to University opened May 14, 1994

EDMONTON ALBERTA'S LIGHT RAIL SYSTEM

Phases	Year Const.	Surface length	sta.	Subway/Br length	sta.	Total length	sta.	LRV's	Cost 1994 US $M	Cost/mi. 1994 US $M
First Segment	1977	3 4 mi	3	0 9 mi	2	4 3 mi	5	14	$146 4	$34 0
Clareview Extension	1980	1 4 mi	1	-	-	1 4 mi	1	3	$14 2	$10 1
CBT Exten to Corona	1982	-	-	0 5 mi	2	0 5 mi	2	20	$108 9	$217 8
McDonald Trans Yard	1982	-	-	-	-	-	-	-	$31 4	-
Grandin Extension	1988	-	-	0 5 mi	1	0 5 mi	1	-	$60 9	$121 8
University Extension	1991	-	-	1 0 mi	1	1 0 mi	1	-	$73 2	$73 2
Totals		**4 8 mi**	**4**	**2.9 mi**	**6**	**7.7 mi**	**10**	**37**	**$435.0**	**$56.5**

PORTLAND,S LIGHT RAIL SYSTEM

Phases	Year Const.	Surface length	sta.	Subway/Br length	sta.	Total length	sta.	LRV's	Cost 1994 $M	Cost/mi. 1994 $M
Banfield MAX	1984	15 1 mi	29	-	-	15 1 mi	29	26	$297 6	$19 7
Westside	1995	15 0 mi	21	3 0 mi	1	18 0 mi	22	46	$940 0 es	$52 2 es
S/N	2003	19 7 mi	44	1 1 mi	-	20 8 mi	44	62	$1,792 4 es	$86 2 es

Compiled by Jim Howell
12-4-95 for TORTA

35473

Jim Howell
3325 N E 45th Avenue
Portland, OR 97213

November 28, 1995

Testimony before the Portland Planning Commission

Re Design Option Narrowing Recommendations

If, today, you make the misguided decision to support putting light rail on the Transit Mall, Portland's progress in public transit development will be set back many years This one light rail line will destroy the operational integrity of the Nations most successful central city bus mall

A plausible argument could be made for usurping space on the Mall for light rail if, the South/North Light Rail Project would absorb a significant number of bus routes and consolidate their ridership on light rail,-- It won't

Upon opening, only 8% of the riders on routes currently using the Transit Mall will benefit from the light rail line to Clackamas County while 20% will suffer service deterioration when their routes are relocated to off mall streets

Ten years from now, conditions will be much worse Over half of the bus passengers using south-east and south-west routes will be banished completely from the Mall.

The argument that bus patrons will benefit if their routes are forced onto other downtown streets is a cruel hoax Forcing large numbers of passengers to walk many blocks, or wait for cross-town buses in order to make transfer connections, now conveniently made on the Mall, is not the way to attract or retain ridership

A recent Transportation Operations Analysis for Light Rail on the Transit Mall prepared for Tri-Met by Kittelson & Associates, Inc states,

"Regardless of how well planned and logical the off-mall bus routing plan ultimately becomes, it will not provide the ease of use and understandability of the current Mall for buses that are moved off the Mall, transfer opportunities within one or two blocks are dramatically reduced "

The current proposal's promised benefits of a "Downtown Grid System" can be more rationally accomplished by modifying some of the existing off-Mall routes for this purpose and by adding downtown shuttle service

Aside from the long term negative impacts on bus service, light rail on the Mall will simply not be able to accommodate future regional transit growth

Metro planners insist that the South/North Light Rail Line will not require more than 20 trains an hour for at least 50 years This may be true for this corridor, but it should be noted that this is not the only corridor that will experience growth Both the south-west (Barbur) and the south-east (Powell-Foster) corridors have far heavier passenger demand than the Milwaukie-CTC corridor and will experience similar growth in the future (see map)

Growth in these corridor will impact Tri-Met's ability to acommodate transit Downtown far more than the S/N Light Rail Line The impact will be much greater than is being assumed by your planners

Including light rail, the total one way capacity of the Mall will decrease from 8,600 peak hour passengers today, to 6,500 in 2015. Beyond 2015 when the Mall's capacity tops out at 7,200 passengers, 16% less than today, bus capacity will plummet to 3,000 passengers.

Assuming a very modest 3% rate of transit ridership growth over the next 20 years and S/N Light Rail, The CBD will have to accommodate over 30% more buses than it does today

My numbers do not match those developed by Metro and Tri-Met planners, primarily because we disagree on what should be assumed as reasonable average peak hour bus and LRV load factors. Capacity needs can be severely understated if unreasonably high vehicle loadings are assumed This is exactly what has been done

Planners have assumed average peak hour bus loads of 60 and train loads of 300 According to Tri-Met's Cordon Counts Report (October 1994) the average Downtown bus load during the PM peak period is 32 passengers and the average MAX load is 160 The average peak of the peak is a bit higher, 37 on buses and 220 on grossly overloaded MAX trains I have assumed an average peak bus load factor of 1 00 or 44 passengers and a LRT load factor of 1 25 or 205 passengers

Obviously, the average loads that are being assumed to determine capacity needs are pure fantasy Of the over 4,800 bus trips counted, 60, or about 1 2% had loads of over 60 passenger and most of those were on articulated buses which are to be phased out

Over estimating vehicle passenger capacity not only effects the number of buses needed to maintain acceptable service, it seriously skews operating costs of light rail bringing into question projected costs to benefits of the entire S/N Project

I sincerely hope you consider these issues before voting to approve the destruction of the Transit Mall

As a long time transit advocate and supporter of light rail for high demand corridors, I am extremely apprehensive of the cost benefits of this project as it has evolved so far

If light rail cannot be accommodated Downtown without sacrificing the Transit Mall, The South/North Project should not be built

Sincerely,

Jim Howell

35473

Table 3

Projected Transit Vehicle Volumes/Patron Capacit
(One Direction Only)

Year	Buses/Hour	LRV's/Hour	LRT Headway	Patron Capacity
1997				
Transit Mall	143	0	0	8,580
Off-Mall	29	13	4 5 min	5,640
Total	172	13		14,220
2005				
Transit Mall	105-110	8	7 5 min	9,000
Off-Mall	29	15	4 min	6,240
Total	139	23		15,240
2015				
Transit Mall	95-100	10	6 min	9,000
Off-Mall	59	15	4 min	8,040
Total	159	25		17,040
Beyond 2015				
Transit Mall	75-80		3 min	10,800
Off-Mall	79		3 min	10,740
Total	159			21,540

THIS PAGE FROM METRO'S REPORT IS AN EXAMPLE OF HOW PLANNERS PUSH THEIR AGENDA BY DISTORTING DATA.

TABLE 3 INDICATES THAT IN 2015 THE TRANSIT MALL WILL HAVE A CAPACITY OF 9,000 PATRONS AN HOUR ON 10 LRV'S AND 100 BUSES. THIS IS NOT CORRECT BECAUSE THEY ASSUME UNREALISTICALLY LARGE AVERAGE TRAIN AND BUS LOADS, 300 FOR A LRV AND 60 FOR A BUS. WITH AVERAGE LOADS LIKE THIS, THE CONGESTION WOULD BE SO SEVERE THAT MANY PEOPLE WOULD NOT USE THE SYSTEM, THUS DIMINISHING OVERALL RIDERSHIP.

BY CONTRAST, TODAY, TRI-MET'S AVERAGE PEAK HOUR BUS LOAD IS LESS THAN 40 AND MAX IS CONSIDERED OVERLOADED WITH ABOUT 220 PASSENGERS. IF MORE REASONABLE LOAD FACTORS WERE USED, THE MALL CAPACITY WOULD BE ONLY 6,500, INVALIDATING OTHER ASSUMPTIONS SUCH AS RIDERSHIP AND OPERATING COSTS.

On the Central Mall there prese
expected to be decreased to 1
service in 1997 or 1998 Wh
bus volumes on the Central
peak hour Then, as light r
be increased to 125-130 b

When the South/North L
approximate 15-minut
service would be incre
By 2015, the peak hou
per hour The ultimate capacity
trains per hour, which if fulfilled would oc

Under the recommended A-2 Option, buses using the Cent
leap-frog fashion as they do today They would move in single file in

December 5, 1995

35473

To Earl Blumenauer

From Wendy Smith Novick

Re Testifiers for December 7 S/N Council Hearing

The following staff have been asked to speak

Steve Iwata -introduce other staff who will speak
-review pertinent City policy

Richard Brandman or Metro **Leon Skiles** -briefly describe steering group decision
(5 minutes) -review decision making schedule (when will Metro vote)

Bob Post Tri Met -briefly describe Tri-Met Board decision emphasize
(12 minutes) -Tri-Met comfortable that LRT will work on mall
-make sure to address issues of worst case and best case scenario of # of buses taken off the mall
-study how to minimize construction impacts as part of PE

Andrew Janssen -mall simulation

The following people are speaking for groups

Greg Goodman (for Chuck Armstrong) -Oversight Committee recommendation
(5 minutes)

Rick Williams -Citizen Advisory Committee recommendation
(5 minutes)

Elected officials

Craig Lomnicki -Mayor of Milwaukie
(3 minutes)

Others we have asked to testify

Clayton Herring	APP
Vern Rifer	Housing Developer, member OC
Steve Getner	Imperial Hotel
Doug Hartman	Overlook Neighborhood Assoc
Michael Powell	Powell's Books
Brian Chase	PSU
Ernie Munch	

Len Bergstein will have some folks testify from South Auditorium

(4) Ruth Scott PCPC

(1) Herring
(2) Rifer
(3) Steve Getner
(4) Ruth Scott

Issues

Downtown mall alignment
Minimum Operable Segment (MOS)
Crossovers

TESTIMONY SIGN-UP FOR 35473

#190 Interstate S/N Light Rail route

IF YOU WISH TO SPEAK TO THE CITY COUNCIL, PLEASE PRINT YOUR NAME AND ADDRESS BELOW

	NAME	ADDRESS & ZIP CODE
1	TERRY PARKER	1527 NE 65TH AVE Portland 97213
2	ANNA Abraham	625 NW Everett #347 97209
3	~~Craig J Lomnicky~~ Lomnicky	Mayor of Milwaukie 4420 SE Johnson Creek Blvd Mil 97222
4	LILI Mandel	1511 SW Park Ave. 97201
5	JIM HOWELL	(OFCET) 3325 NE 45TH 97213
6	Zack Semke	Coalition for a Livable Future 534 SW Third, Ste 300 97204
7	Jan Anderson	Resident/Employee in Downtown 1217 SW Morrison #349 P+L 97205
8	DAVID ZAGEL	3104 NE Schuyler Pdx 97212
9	Roy Polani	6110 SE Ankeny St. PDX 97215-1245
10	~~Irwin~~ Mandel	1511 SW Park Ave 97201
11	BILL NAITO	5 NW Front 97209
12	Alex Pierce	650 N W ST. HELEN'S AVE
13	STAN LEWIS	111 S.W. HARRISON #2D, 97201
14	Louise Beaudreau	1511 SW Park Ave #1201 97201
15		
16		
17	Helen Farrens	395 SW Condor Ave 97204
	(only if no	other passengers left)

Date: 12/7/95

TESTIMONY SIGN-UP FOR

35473

#1908 S/N Light Rail Route

IF YOU WISH TO SPEAK TO THE CITY COUNCIL, PLEASE PRINT YOUR NAME AND ADDRESS BELOW

	NAME	ADDRESS & ZIP CODE
✓	Julie Leuvrey	1800 SW 1st Ave P-97201
	Steve Rosenberg	222 SW Harrison P-97201
	Susan Bowlsby	255 SW Harrison P-97201
✓	AL JASPER	19 NW 9th 97209
✓	Michael Powell Powell	7 NW 9 97209
✓	RICHARD LISHNER	2545 SE 37TH 97202
	Fred Nussbaum	6510 SW Barnes Rd 97225
	Larry Mills	1406 N. Winchell 97217

Date: 12/7/95

THE OREGONIAN FRIDAY NOVEMBER 24, 1995

Downtown is more than the Transit Mall

By IRWIN and LILI MANDEL

IN MY OPINION

Running the south north light rail on the Transit Mall may prove to be as crippling to the development of downtown Portland as placing the Interstate 5 freeway on the east bank of the Willamette was for the development of the Eastside

In order to assure future growth and prosperity we must have a vision of *all* of downtown as the heart of a prosperous Portland We cannot continue the short sighted view of the Transit Mall — and only the Transit Mall — as the center of a business district

The 3 to 7 years of mall reconstruction will permanently destroy downtown s economic viability People will not shop in a severely disrupted downtown tourists will not visit a severely disrupted downtown, conventions will not book hotel space in a severely disrupted downtown All of these business activities will be shifted away from downtown Once behavior patterns are established they are not easily altered Downtown may never recover from the deleterious economic effects of these severe disruptions

In addition, the present plans to run the trains on the Mall will force the re routing of buses to other avenues This will result in more traffic problems than we now have and also a significant increase in air pollution throughout downtown

There is a better south north light rail route that will enable our vision of *all* of downtown as the heart of a prosperous Portland to be realized Quite simply, the trains run on 10th and 11th avenues as a south north parallel turn on Jefferson and Columbia streets as an east west parallel and resume their south north route on Sixth and Fifth avenues (which at the intersections of Columbia and Jefferson are no longer part of the Transit Mall)

Let's shed light on the benefits of running our light rail on this route

Imagine the transformation of 10th and 11th avenues into grand tree lined beautiful brightly lit bustling boulevards The boulevards are decorated with sculpture and flowers

ALLABOARD!

Let s begin our train trip at Harrison Street and Sixth Avenue at the beautiful new station on the enlarged PSU campus We travel north on Sixth Avenue and turn west at Jefferson carrying our riders to the present business district From here it is only a short walk or a speedy free bus trip through the present business district

Our next stop is at the South Park blocks in the Cultural District These magnificent tree lined blocks are filled with what may be the last stand of Dutch Elm trees in the United States On these Park blocks we see the Portland Art Museum Oregon History Center, Portland Center for the Performing Arts, Arlene Schnitzer Hall Pacific Northwest College of Art, the Northwest Film Center and some of our notable churches This train stop also provides easy access to the Heathman and Hilton hotels, the Main Street Playhouse and the movie complex at 1000 Broadway

We continue our journey west to 10th Avenue and turn north onto the Grand Boulevard On our northbound route we pass the YWCA the Oregon Ballet Theatre school our rebuilt architecturally historic Central Library, the Galleria glowingly lit 'o resemble buildings in Vienna and Paris, and the authentically restored Governor Hotel with its charming outdoor cafe We see the many new commercial developments that have been built on the avenue and are peripherally aware of the comparable development along 11th Avenue

As we cross Burnside Street to connect to an east west combination going to Union Station and the Steel Bridge, we look at the busy and recently completed Fifth and Sixth avenue bus malls in Old Town/Chinatown As we pass the malls we are reminded of how much money and how many businesses we have saved by not ripping up and reconstructing these malls almost as soon as they were finished This is the last stop on our visionary journey through downtown

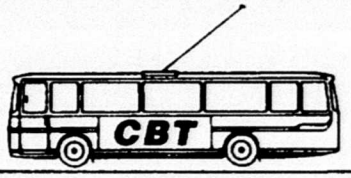
Some say we cannot take this journey because of prior plans and laws

Remember the pungent statement by Bill Naito "Some laws are made by God and some are made by man

Irwin and Lili Mandel live on Southwest Park Avenue in downtown Portland He is a past president of the Downtown Community Association and served on the Downtown Rail Advisory Committee Responses can be sent in care of the op ed page at The Oregonian 1320 S W Broadway Portland 97201

1908

35473



CITIZENS for BETTER TRANSIT

6110 S E Ankeny Street, Portland, OR
Tel 503 232-3467 97215-1245

Testimony for the City Council of Portland hearing on the South/North light rail project narrowing of alternatives to be carried forth in the Draft Environmental Impact Statement held on December 7, 1995 in the Council Chambers.

Light Rail on the 5th/6th Avenues Transit Mall constitutes a fatal flaw for both light rail AND the bus system. Many un-biased, expert witnesses have testified offering facts and figures to support the reasons, we will not repeat them.

Political considerations and perceptions have been driving this light rail project off track from an effective, economic tool for managing growth, light rail has been turned into an in-effective, fatally compromised, over-expensive, politicized boondoggle!! Sound transit principles guided the first light rail line but have now left the scene and sensible people are being confused and browbeaten by so-called planning experts concerned only about justifying their perceptions of political reality.

Still, common sense is more useful than all so-called planning experts' responses to rational, fact-based criticism and common sense should tell you that Noell Webb, the lone dissenting Planning Commissioner, and Al Jasper, the owner of Marco Polo Garden Restaurant, are both right on track, expert planners' responses notwithstanding Webb is quoted as worrying that if the region did not build the line for the correct potential capacity, the problem could not be fixed later, "If we can barely afford to build this system" she said in response to planners' comments about funding concerns, "we cannot afford to make a mistake at all " Jasper is quoted for the Historic Old Town Business Association, which favors either a surface line on 10th and 11th Avenues or a 4th Avenue subway, as discounting estimates of the subway costs saying "You can build a Volkswagen subway or you can build a Rolls Royce subway "

The short Fourth Avenue subway, from First, under the Burnside Bridge, to I-405, is the only sound transit system solution which is capable to accomodate future growth with sufficient capacity which is what this project should be, must be, all about, as pointed out by Planning Commissioner Noell Webb. Its alleged costs are purely speculative, totally unreliable, if not appropriately studied in an open process!!

However a few very important facts are crystal clear just by using common sense

- Only one, not two avenues would be torn up during construction,
- There will be no permanent sacrifice of automobiles and service vehicles access to Fourth Avenue,
- No disruption to Broadway businesses and Hotels AND
- Best proximity to the Transit Mall which will face no disruption of either the existing transit system or of the businesses which were impacted when the Mall was built.

If a subsurface, short, low-cost Fourth Avenue Light Rail route is not carried forward in the Draft Environmental Impact Statement, we will reluctantly no longer actively support this project, too much is at stake for the future of our City and Region for us to pretend that the taxpayers money will not be wasted on this fatally flawed project As Ms Webb truthfully and rationally stated "If we can barely afford to build this system, we cannot afford to make a mistake!!!"

We stand for erring in favor of capacity because correcting lack of it may very well be impossible!!!

Thank you for the opportunity to help you in reaching a common sense decision

R.J.Polani

R.J.Polani, Chair

35473 1908

Bank of America

W Charles Armstrong
Chairman
Chief Executive Officer

December 6, 1995

City Council
City of Portland
1220 SW Fifth Avenue
Portland, OR 97204

Dear Council Members

A State Economic Development Commission meeting prevents me from appearing before you in person today As Chairman of the Downtown Portland Oversight Committee, however, I wanted to summarize the findings and recommendations of that committee

The Downtown Portland Oversight Committee was formed to 1) assist in the development of light rail alignment options utilizing the 5th and 6th Avenue Transit Mall, 2) establish criteria to evaluate those options, and 3) forward a recommendation to the South/North Steering Group on whether the options adequately address those criteria or whether alignment alternatives in addition to the 5th/6th Avenue Transit Mall should be advanced into the draft environmental impact statement for further study

The Oversight Committee went into the process with an open and somewhat skeptical mind and rigorously studied the issues before making a recommendation The recommendation represents an immense amount of work by technical staff and an exhaustive commitment of time by the participants on the Oversight Committee

The Committee performed the charge given to it by the project and found that the options being recommended adequately address the criteria adopted by the Metro Council and the Oversight Committee Of paramount interest to the committee were the questions "Does this alignment work for downtown? Is it good for the economic health of the Central Business District as well as working for transit, autos and pedestrians?" We found the answers to the questions an emphatic "Yes "

Members of the Committee actually went out to the transit mall during the evening commute to visualize first hand the impacts of light rail on the mall The consensus was that it could work

The recommended option is favored by the overwhelming majority of the downtown community It would retain important automobile access on the Mall, enhance the pedestrian environment on the Mall, and would ensure efficient transit operations for both buses and light rail on the Mall with the least construction impacts of any options studied

Bank of America Financial Center Oregon
121 SW Morrison Street Suite 1700 Portland OR 97204 Phone 503/275 1999 Fax 503/275 1550

Specifically, in the north Mall, the committee concluded the construction impacts can largely be contained within the existing street right of way and stays out of the sidewalks

Connections to the Mall were also important to the Committee Harrison Street in the South was recommended, but it should be designed to fit within the median, and there should be a study to determine whether a station is warranted on Harrison near 2nd and 3rd Avenues In the north, the Committee prefers an alignment that would extend closer to Union Station (via Irving Street) but recognizes another alignment on Glisan Street should be studied until issues of cost, traffic impacts, displacement and ridership can be resolved

The Oversight Committee also went beyond the original charge of the Committee because of the intense pressure to ensure that 5th and 6th Avenues not only worked but were the best streets for light rail The Committee concluded that only the 5th/6th alignment be studied further The Committee believed we could not turn our backs on 20 years of planning and investment, which has created the existing high densities along 5th and 6th Avenues Also contributing to the Committee's conclusion is that 5th and 6th Avenues have been built to accept light rail Other streets adjacent to the high density spine, such as 4th and Broadway, have been built for high auto use Both types of streets are needed for a healthy downtown

In the end, the Committee voted unanimously for the 5th/6th Avenue alignment The technical data support that conclusion, the historical data support that conclusion, and, make no mistake, no other option has wider support in the downtown business community

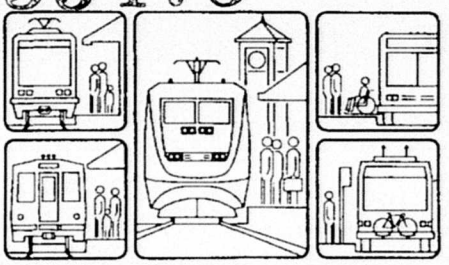
I also wanted to briefly share with you the committee's concern regarding construction mitigation The proposed 5th/6th Avenue alignment and the recommended option would minimize the scale and duration of construction of all the alignments and options considered However, if the construction of South/North is to be completed successfully, it must be completed as quickly as possible with a strong construction management plan Downtown Portland should be identified as a special construction zone with oversight provided by both Tri-Met and the business community, with appropriate assistance from the City Moreover, selection of the construction contractor must be designed to maximize adherence to the construction management plan

I am confident that with the active participation and good intentions of the business community, Metro, Tri-Met and its users and the City of Portland, we can make this alignment another showcase for Portland and the greater metropolitan area

Sincerely,

35473 1908

Association of Oregon Rail and Transit Advocates
AORTA • P O Box 2772 • Portland Oregon 97208-2772
Also known as OreARP • Oregon Association of Railway Passengers



Testimony of Fred Nussbaum, AORTA Strategic Planner
Before Portland City Council, December 7, 1995
Regarding the S/N Light Rail Project

1 Focusing on the Process

2 One thing we should have learned from the Westside Light Rail planning process is this

> Letting the powerful and influential subvert technical- and consensus-based decision-making invariably leads to mistakes which result in significant inconvenience to users and/or substantial additional costs for the taxpayers

3 The downtown alignment study process and the Milwaukie-Clackamas Town Center routing choice both represent the subversion of the process by powerful interests, as does the inclusion of the Schnitzer-Zeidel river crossing option

4 **Westside Tunnel, Misused Example**
The Westside tunnel problems are often cited as a reason why Portland shouldn't even consider tunneling downtown for a short subway segment

- ☐ Local "experts" imply that Portland doesn't have the right geology for efficient tunneling, and/or
- ☐ Local "experts" imply that tunneling is very unpredictable, usually very disruptive and extremely risky
- ☐ Such implications are pure balderdash and are twisting of facts to meet a specific agenda

5 **Westside Tunnel Problems, Good Example of Faulty Process**

- ☐ The problems with the tunnel are not so much a problem of geology or technology, but the direct result of politics subverting sound technical analysis
- ☐ Early on, powerful people in this body and at Metro decided that the Metro Zoo had to have a station on the Westside line Citizen and other advisory bodies were given the "freedom" to consider any alignment as long as the Zoo got its station
- ☐ When it became obvious that a surface alignment posed significant environmental problems and was drawing strong neighborhood opposition due to those concerns, the previously maligned idea of a tunnel was embraced
- ☐ However, the powers-that-be were not looking at the tunnel in the same way that those that had vociferously proposed the idea in the first place, namely a straight, deep shot directly from portal to portal, without an intermediate station to carry passengers quickly between Washington County and the Central City
- ☐ The Zoo station "tail" continued to wag the dog, so that we had to tunnel an alignment up and down the hill underground, staying much closer to the surface than a straight, deep tunnel would
- ☐ Most of the problem rock conditions, that have delayed the project and added to its cost are in areas relatively close to the surface, something any good geologist could have predicted

6 If you carefully review the record, you will see that all the advisory bodies regarding the downtown alignment received the same kind of treatment as those advising the Westside

- ☐ From the start, committee members were heavily pressured to give preference to a "Surface Mall" solution
- ☐ So-called studies or analyses on other alternatives (e g 4th & Broadway, 4th Avenue Subway) were never flushed out in black and white on paper, where assumptions, methodology and conclusions could be subject to scrutiny and informed questions
- ☐ The charges of some bodies (e g Downtown Alignment Oversight Committee) were so narrowly defined that they could not formally investigate many of the alternatives
- ☐ Those of us involved in this process or closely following it have a clear sense of *deja vu* here
  Somebody of power clearly decided and unequivocally directed long ago that any alignment downtown was fair game <u>as long as it was a surface Mall alignment</u>

7 **"Time is of the Essence" is again being used to rush certain decisions, in a replay of the worst of the Westside experience**

- ☐ Complicated decisions, such as what to do with downtown are being rushed because of the Congressional "Window of Opportunity" to secure half the funds We are sure this argument has been used with the various advisory bodies to scare them into not "reopening" discussions of alternatives The powers that be are calculating on the Mall surface alignment as having the smallest number of opponents, and therefore being the easiest to "move through the process"
- ☐ The result is that we will get, not the best solution for downtown, but the solution which can be easiest maneuvered through the local and national process
- ☐ In the past this method may have worked However, since local and state taxpayers are now paying 50% of the cost, such a strategy may backfire People who are "pro-Light Rail" may no longer allow themselves to ignore the means used to achieve those ends, especially if the end is a badly compromised, inefficient and ineffective transit system

35473 1908

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North/South Max and the Future of Downtown Portland

What is the best route for the new North/South Max line through Downtown Portland? In the next few weeks our political leadership will be making critical decisions narrowing the design options for Max - the most important urban design decision in Downtown in years. Unfortunately, the city is missing an extraordinary opportunity to determine the future shape of Downtown in a rush to judgement framed by outmoded assumptions and hidden agendas. Our alternatives have been needlessly narrowed to Transit Mall options, with critics effectively silenced by the framing of the debate's parameters. There has never been a serious investigation of surface alternatives to the Transit Mall because in doing so we would actually have to decide the future importance of mass transit vis-a-vis the automobile in Downtown Portland.

In the next few years there will be a new Max line built in Downtown Portland as part of a three billion dollar commitment to mass transit. North/South Max will take 3-5 years to construct, and will tear up two streets and most of Downtown in the process. There are two real questions we need to ask our leaders about their Max dreams - Whose ox will be gored and what will Downtown look like when we are on the other side of the millennium?

There are two competing visions of Downtown Portland's future behind this debate over Max. One vision is of a Downtown still dominated by the automobile, with North/South Max located in a mass transit ghetto confined to a compromised Transit Mall. Adherents of this vision are trying to find the best way to "insert" a new Max line through Downtown so as to least inconvenience people who will continue to refuse to ride mass transit. They believe that Max is at best a necessary evil, and have followed an unwritten oath to "do no harm" to their real interest - maintaining the status-quo of an auto-dominated Portland. If they can keep the Max on the Transit Mall, they will still have "lost" only two streets to pedestrians, the poor and middle class, and anyone who is just too damn smart to drive and park Downtown.

The alternative vision for Portland in the next century is of a city whose transit system truly provides the primary means of getting to and around Downtown. The new Max line could be used to transform another entire section of Downtown Portland. We should use mass transit funds to upgrade another two streets in Downtown Portland, to once again leverage scarce resources into both transportation and urban design. The most frustrating part of this debate, or lack of one, is that this idea of putting mass transit money into urban design is the legacy of the existing

Transit Mall We are refusing to duplicate our previous success in rationalizing and dignifying mass transit, and in creating a quality pedestrian environment, because many consider the award-winning and much-beloved Transit Mall a failure, and its expansion a threat

This is the context for the refusal to seriously study proposals for putting the new Max line on 4th and Broadway The auto lobby knows that this alignment gets to the heart of the matter, the continued dominance of the automobile in a supposedly transit-friendly city They cling to the Central City Plan which calls 4th & Broadway "Auto Access Streets", refusing to question twenty-year old assumptions about mass transit and the automobile A 4th & Broadway alignment , with one track running North on 4th Avenue, and it's couplet running South on Broadway, would have the same ridership figures and provide essentially the same destination points as a line on 5th & 6th Yet a 4th & Broadway line would upgrade two more streets downtown, with absolutely no disruption to the current Transit Mall or mass transit service to Downtown Portland The city would be effectively widening the Transit Mall to four blocks downtown, from 4th through Broadway This would not only strengthen the pedestrian realm downtown, but would also allow for further expansion of bus service in the future

What are the costs? A 4th & Broadway Max will not "ruin" Downtown - the truth is that the presence of Max will not even ruin those streets for the automobile A Max line on those two streets would replace one existing parking lane and one existing auto lane with widened sidewalks and a Max track At rush hour, with no parking allowed, we could maintain the current level of three auto lanes Business leaders bemoan the loss of auto access, but do not seem willing to let the city's planners take a shot at solving access problems in the same creative way they have attacked those problems on 5th and 6th While many have testified about the obvious disaster of Max construction at their front doors for 3-5 years, no one talks about the benefits of being on a Max line for the next fifty years And those who decry the loss of parking spaces know that we can replace any lost parking very efficiently with one new Smart Park lot

The auto lobby's bottom line is that the construction of a new Max line should not disrupt auto traffic Downtown - a worthy if ultimately illusory goal But what about our existing mass transit system? In our effort to expand our mass transit system, we risk totally disrupting the bus system for 3-5 years while we rip up the Transit Mall We will be lucky to have as many riders when we finish the new Max line as when we started the whole process

What will Downtown Portland look like in 2005? If we "insert" Max into Downtown on the Transit Mall, after much disruption, we hopefully will have our Transit Mall back without seriously compromising its function and ambience We will have spent three

billion dollars just to maintain transit capacity downtown, replacing busses with Max trains. Any additional bus capacity in the future would be on "orphaned" bus lines on other Downtown streets, a second-class transit system with none of the amenities or clarity of the present Transit Mall. And of course, and don't let anyone pretend otherwise, 4th and Broadway will be gridlocked in any case. If we place the new Max line on 4th & Broadway, Downtown Portland in 2005 would have four main streets dedicated to the proposition that pedestrian and mass transit riders (those "new pioneers" that TriMet is recruiting) are the lifeblood of the city. Four streets that allow auto access but are not dominated by the automobile. Four streets where art and fountains and street trees and those beautiful bricks enrich the pedestrian experience. Four streets which would allow TriMet to actually expand transit coverage and capacity, and meet our 2040 transit targets. Four streets whose pedestrian capacity and ambience actually provide the density and street life necessary for coffee, books, and beer, those three mainstays of urban life. And four streets where Portlanders, especially those smart enough to use mass transit, could raise a glass to old leaders who took their time to study surface alternatives to a Transit Mall alignment.

ELIOT NEIGHBORHOOD ASSOCIATION

November 17, 1995

Rod Monroe, Chair
& S/N Light Rail Steering Committee
600 NE Grand
Portland, OR 97232

Dear Chair Monroe and Committee Members

The Eliot Neighborhood Association's (ENDA) Land Use Committee voted at its October 11th, 1995 meeting to support the City of Portland's Regional Rail Program's four recommendations listed on page 29 of its September 1995 Station Area Analysis report

Specifically this includes the two options of (1) East I-5 freeway and Kerby Street station and (2) Wheeler Avenue and Flint Street Stations In addition, we support further study of additional stations on each of these two alignments in order to better service the Eliot neighborhood, Broadway/Weidler Corridor and the north side of the Rose Quarter We also support further study of Kerby Avenue Station placement alternatives

We also ask that as part of the DEIS a ridership measure be added for the projected future development potential of the routes and stations based upon zoning and other factors As part of the Albina Community Plan process ENDA supported zoning the area around the proposed Flint-Russell station for the type of high-intensity development deemed appropriate for transit station areas We feel this deserves as much consideration as the need to entice suburban communities wedded to urban sprawl and auto use

Finally, we want the Steel Bridge to Expo Center segment to be part of one of the alternative MOS's studied in the DEIS A northern leg of the system will complete the rationale for putting the new arena in the central city of Portland, lessen Rose Quarter parking in Eliot, provide better access to jobs, education, training, and services for inner N/NE residents, and be an economic generator for the inner N/NE

The committee is authorized to act for the association on land use and transportation matters, therefore this is the position of ENDA

Sincerely,

Steven D Rogers
ENDA Land Use Chair
533 NE Brazee
Portland, OR 97212
503-281-1799

c Jenna Cernazanu, METRO
Phil Bogue, Tri-Met
City of Portland Regional Rail Program
City of Portland Council Clerk
Lloyd Lindley, Broadway/Weidler Corridor Study
Paul Zumwalt, Oregon Arena Corporation

35473

South North Transit Corridor Study

Design Option Narrowing Final Report

South/North Steering Group

November 20, 1995

METRO

Exhibit A

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

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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

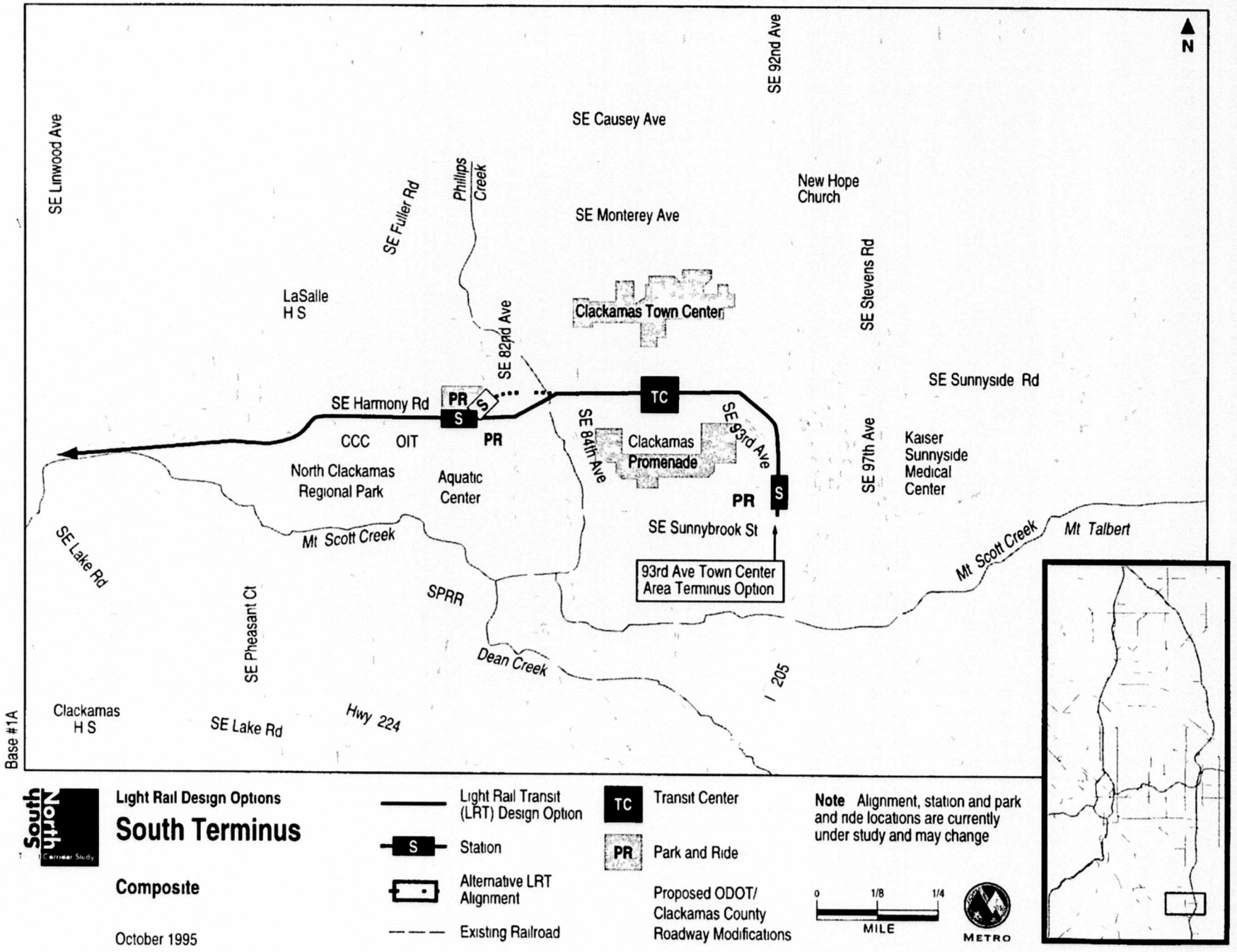
1 *North of Clackamas Town Center Alignment to Sunnyside Area Terminus* From the S E Fuller Road/S E Harmony Road vicinity, the alignment would run along the west and north circumference of the Southgate community It would then cross S E 82nd Avenue on an elevated structure and head eastward in the vicinity 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


N
SE 92nd Ave
SE Causey Ave
SE Linwood Ave
Phillips Creek
SE Fuller Rd
New Hope Church
SE Monterey Ave
SE Stevens Rd
LaSalle H S
Clackamas Town Center
SE 82nd Ave
SE Sunnyside Rd
SE Harmony Rd
PR
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TC
SE 84th Ave
SE 93rd Ave
SE 97th Ave
CCC
OIT
PR
Clackamas Promenade
Kaiser Sunnyside Medical Center
North Clackamas Regional Park
Aquatic Center
PR
S
SE Sunnybrook St
SE Lake Rd
Mt Scott Creek
Mt Talbert
93rd Ave Town Center Area Terminus Option
SPRR
SE Pheasant Ct
Dean Creek
I 205
Clackamas H S
SE Lake Rd
Hwy 224
Base #1A
South North
Light Rail Design Options
South Terminus
Composite
October 1995
Light Rail Transit (LRT) Design Option
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

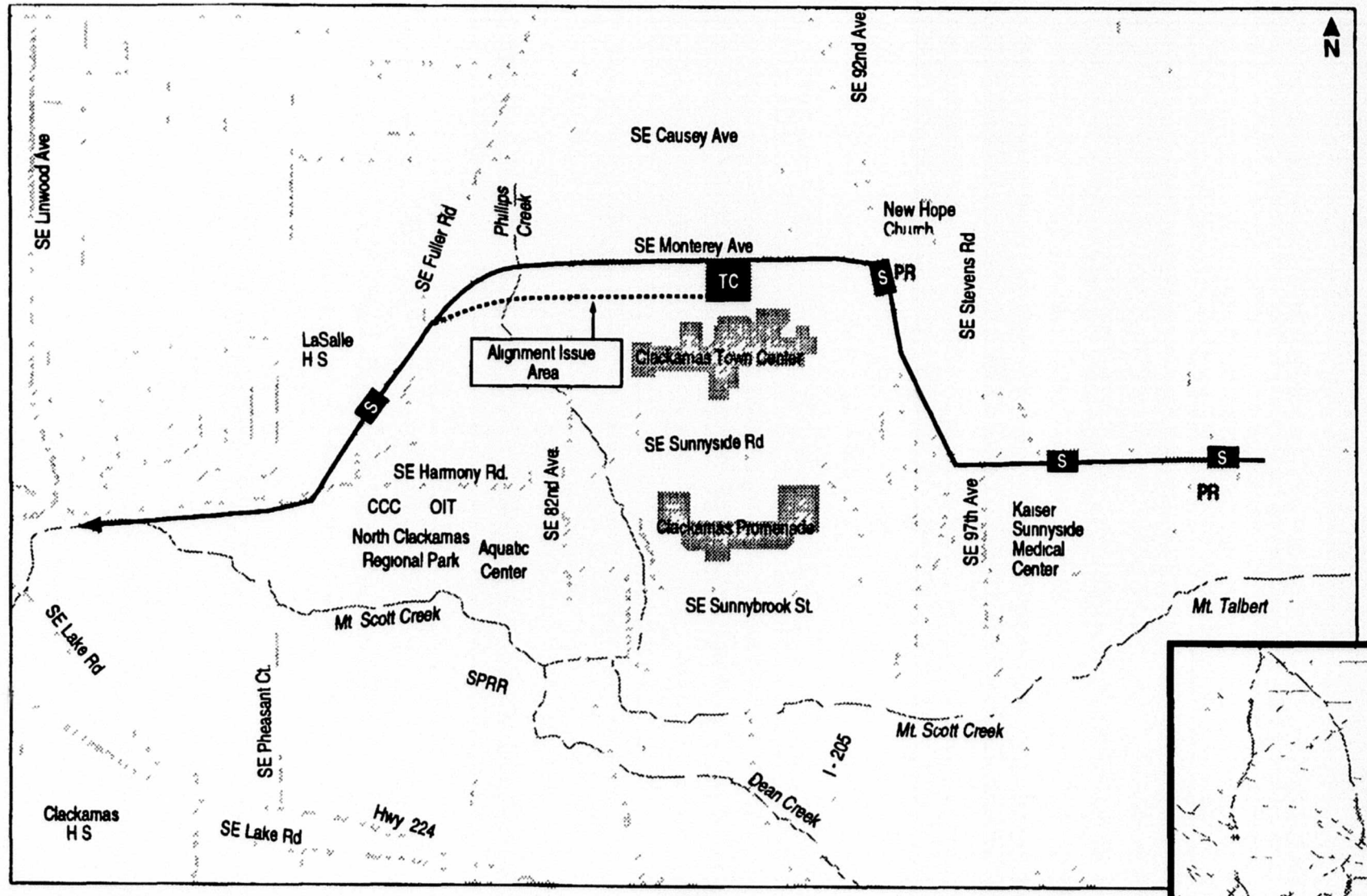

Figure 2

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

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[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

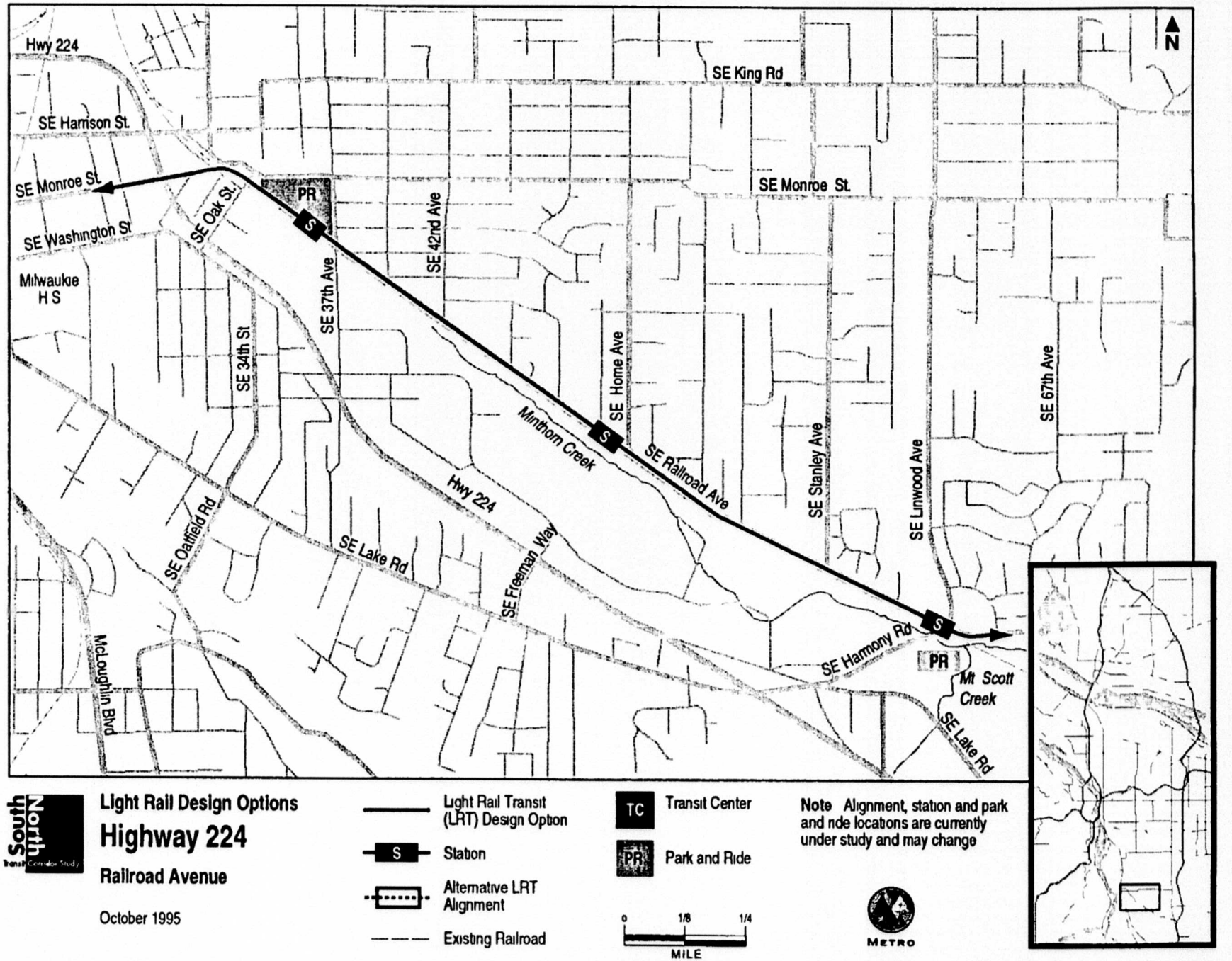

Hwy 224
SE King Rd
SE Harrison St
SE Monroe St
SE Monroe St
PR
S
SE Oak St
SE Washington St
SE 42nd Ave
Milwaukie
H S
SE 37th Ave
SE 34th St
SE Home Ave
Minthorn Creek
S
SE Railroad Ave
SE Stanley Ave
SE Linwood Ave
SE 67th Ave
Hwy 224
SE Oatfield Rd
SE Lake Rd
SE Freeman Way
McLoughlin Blvd
S
SE Harmony Rd
PR
Mt Scott
Creek
SE Lake Rd
N
South
North
Transit Corridor Study
Light Rail Design Options
Highway 224
Railroad Avenue
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 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

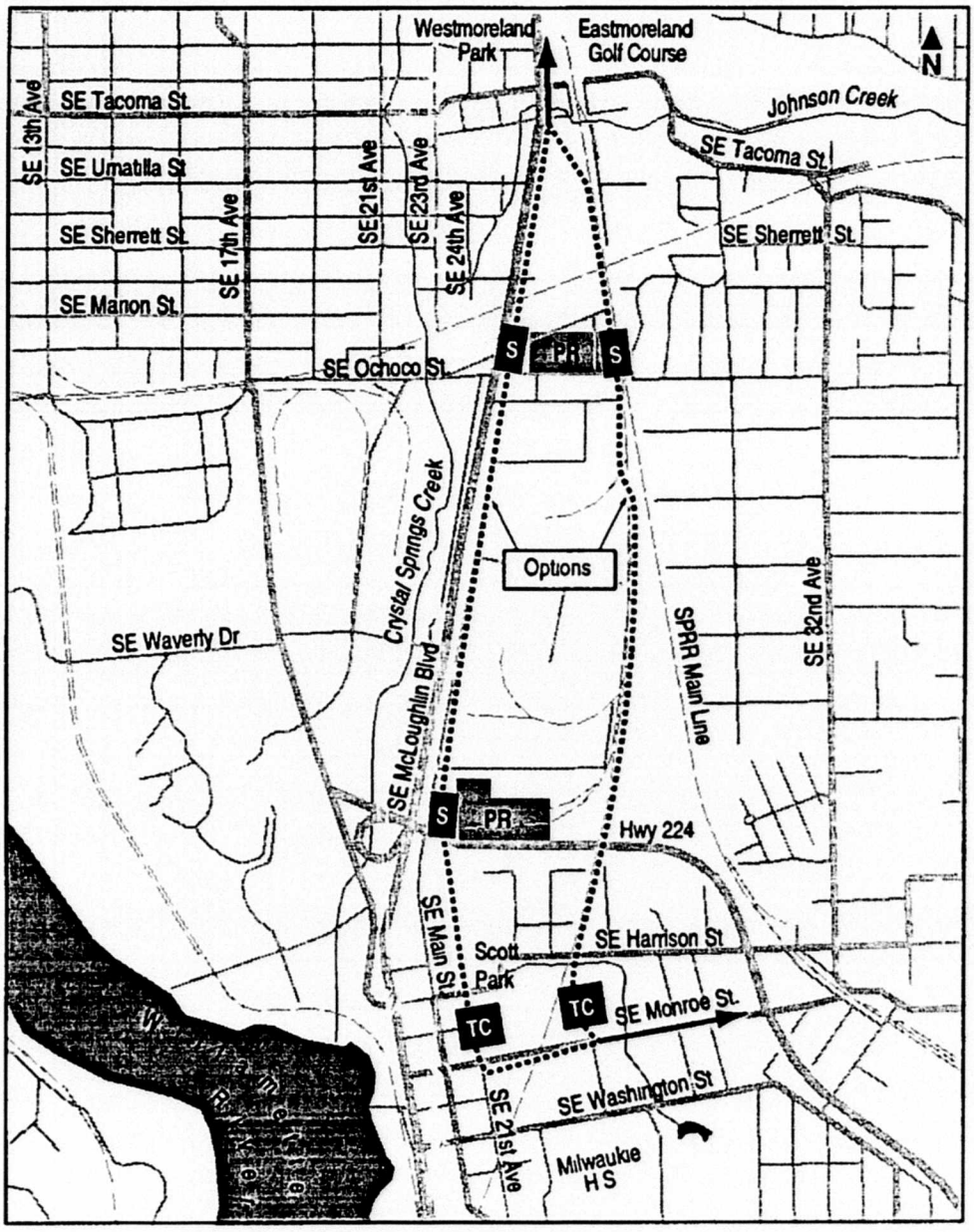
2 *S E Monroe to S E 21st Avenue/S E McLoughlin Boulevard* From the overcrossing of Highway 224, the alignment would proceed westerly on S E Monroe Street S E Monroe Street would be configured to operate two tracks of light rail and one westbound traffic lane between S E 25th and S E 9th Avenues

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

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)

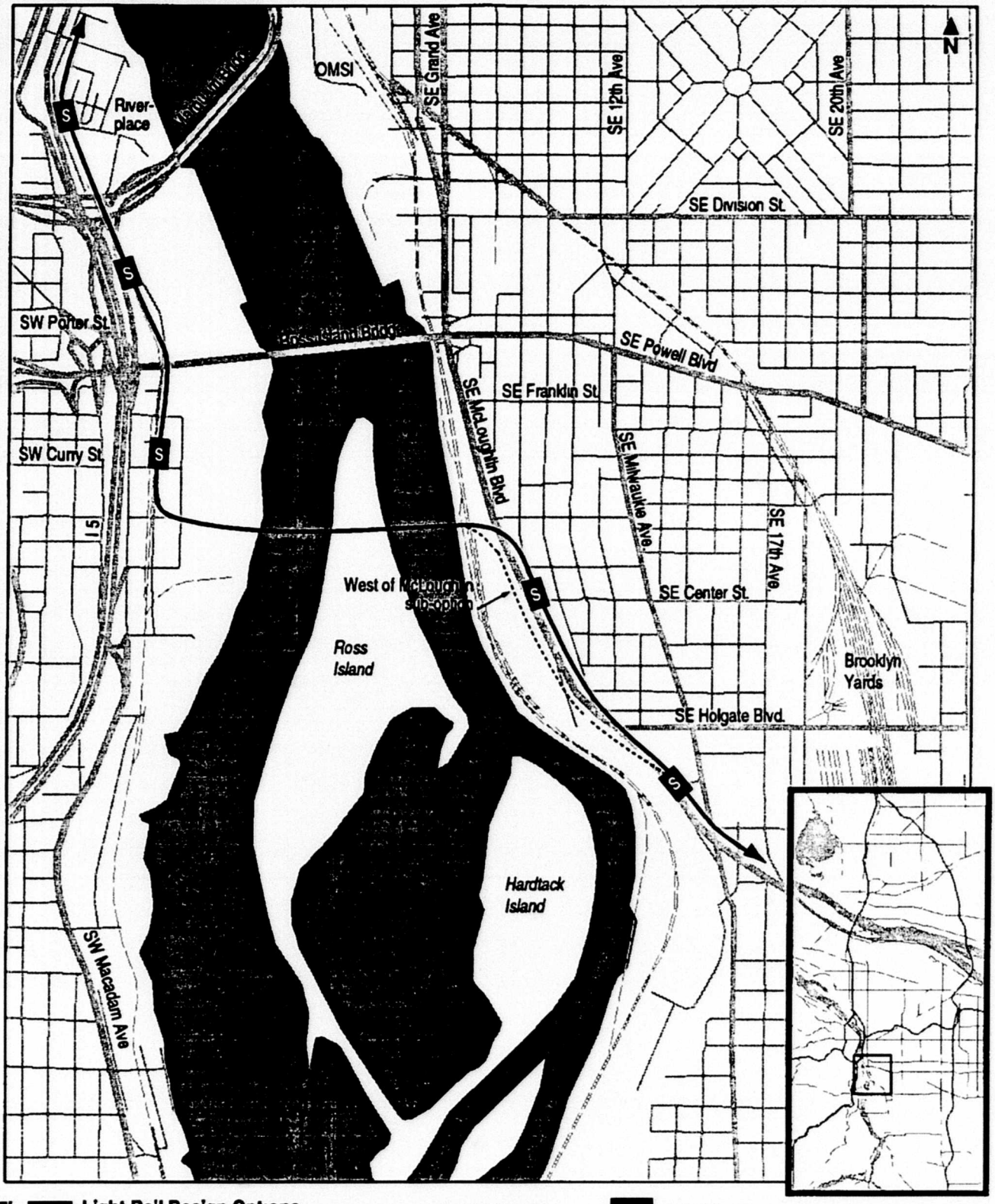
The South/North Project Steering Group determined during the Tier I decision process that both East side/Caruthers Crossing option(s) and Ross Island Crossing option(s) will be carried forward into the DEIS Thus, the issue at hand is to determine the best Eastside/Caruthers Crossing option and the best 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



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

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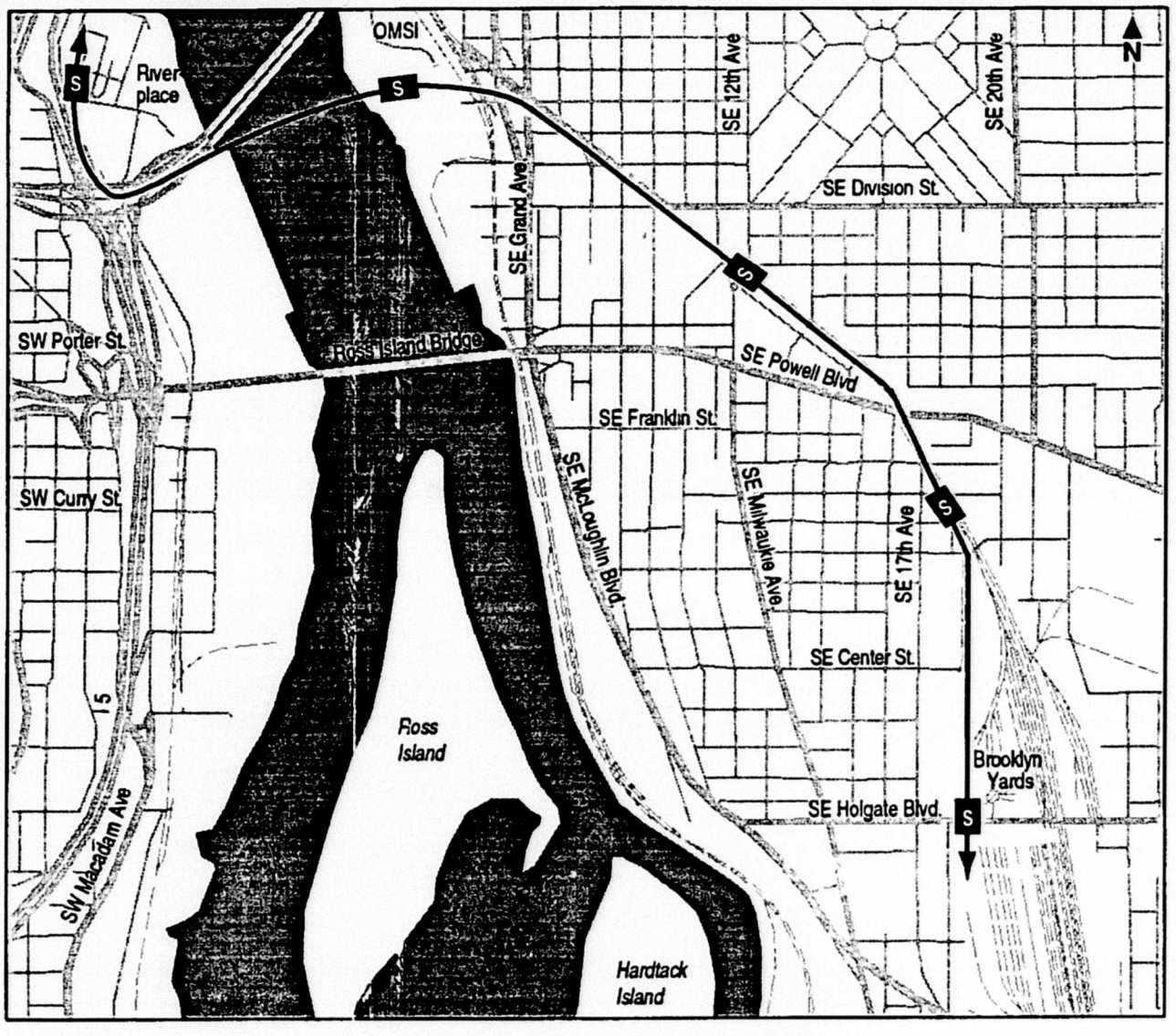

South North Transit Corridor Study

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

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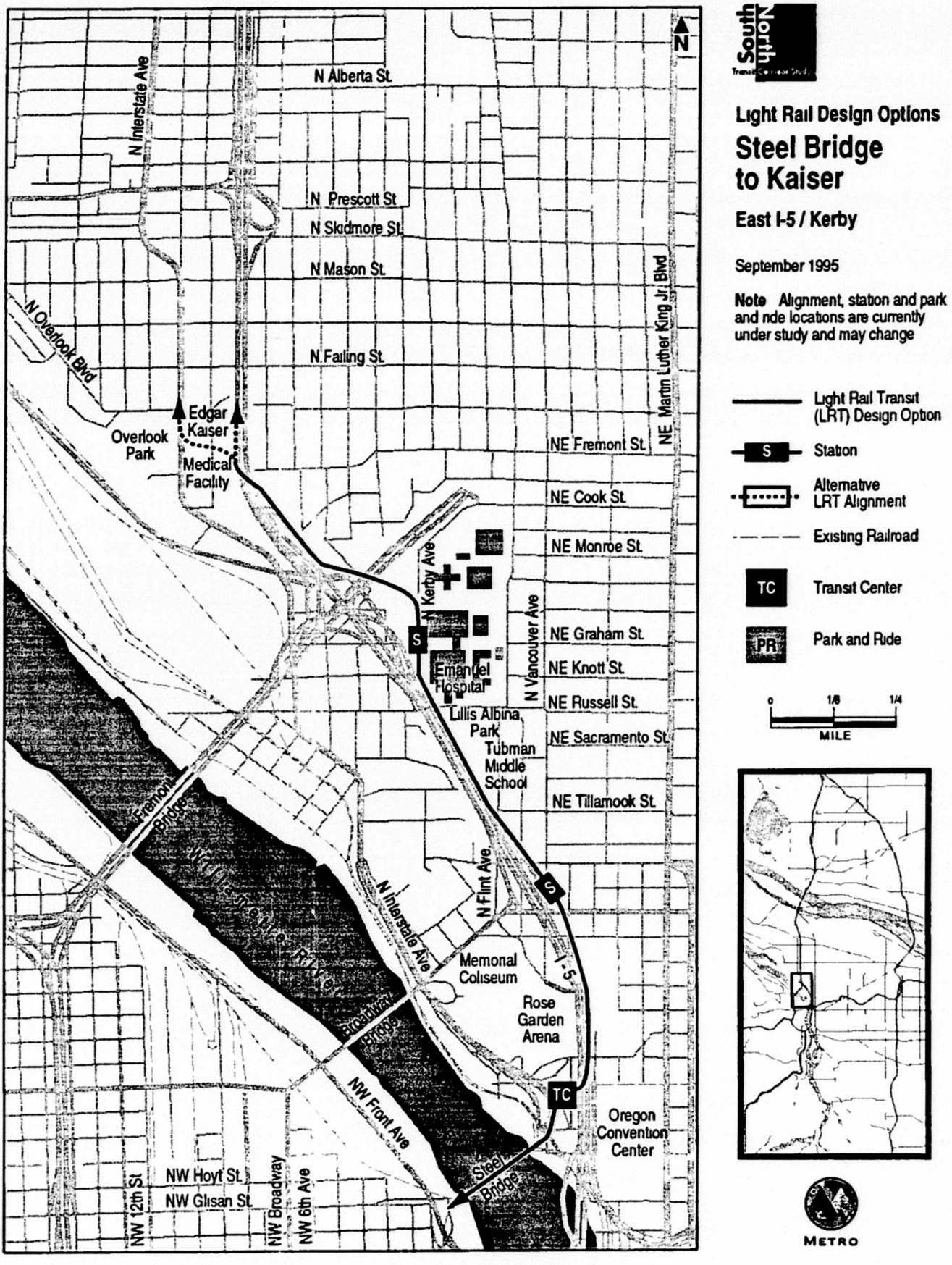
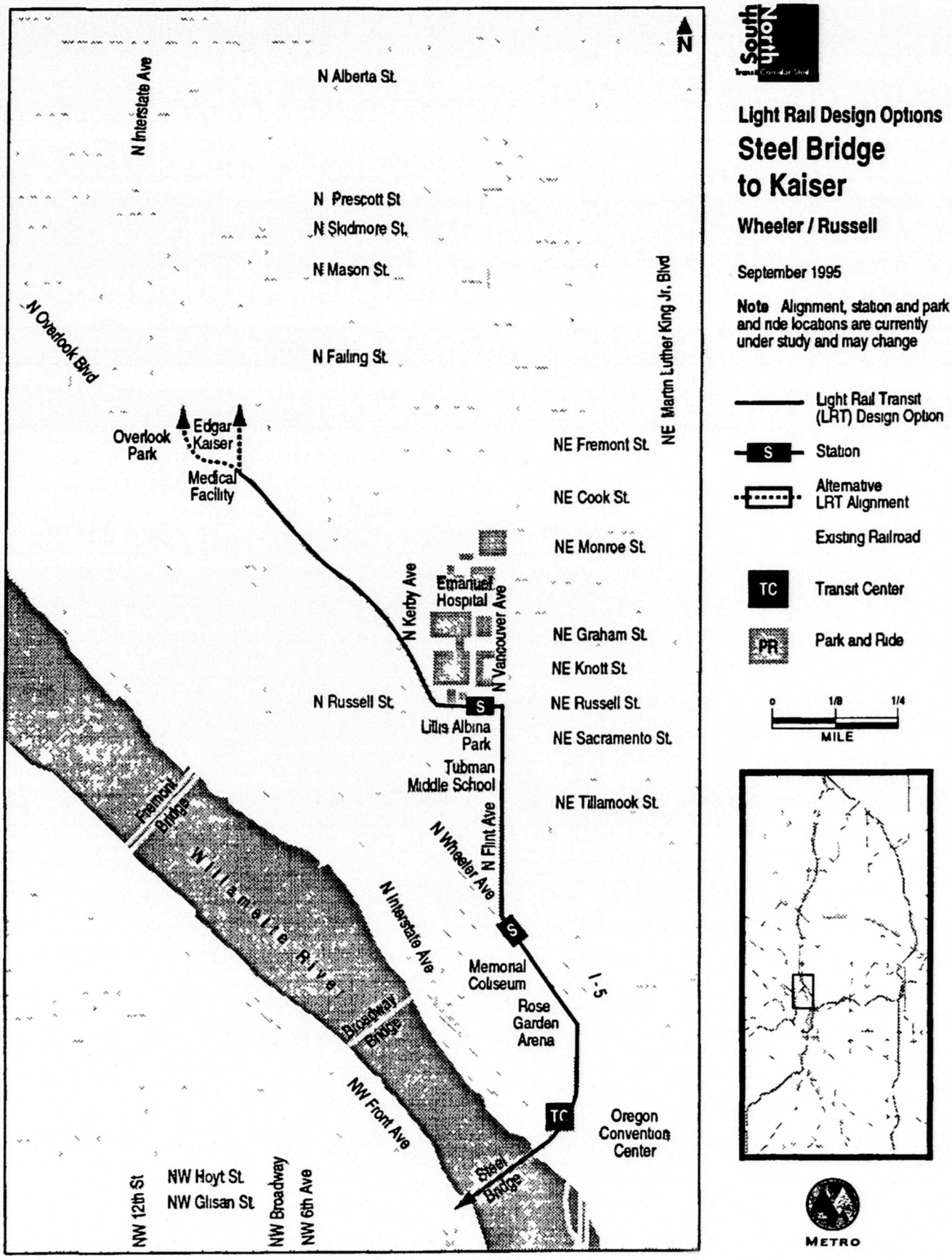


Figure 7


N
N Alberta St
N Interstate Ave
N Prescott St
N Skidmore St
N Mason St
N Failing St
N Overlook Blvd
NE Martin Luther King Jr. Blvd
Overlook Park
Edgar Kaiser Medical Facility
NE Fremont St
NE Cook St
NE Monroe St
N Kerby Ave
Emanuel Hospital
N Vancouver Ave
NE Graham St
NE Knott St
N Russell St
NE Russell St
Lillis Albina Park
NE Sacramento St
Tubman Middle School
NE Tillamook St
Fremont Bridge
Willamette River
N Flint Ave
N Wheeler Ave
N Interstate Ave
Memorial Coliseum
Rose Garden Arena
I-5
Broadway Bridge
NW Front Ave
Oregon Convention Center
Steel Bridge
NW 12th St
NW Hoyt St
NW Glisan St
NW Broadway
NW 6th Ave
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MILE
South
North
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
Station
Alternative LRT Alignment
Existing Railroad
Transit Center
Park and Ride
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

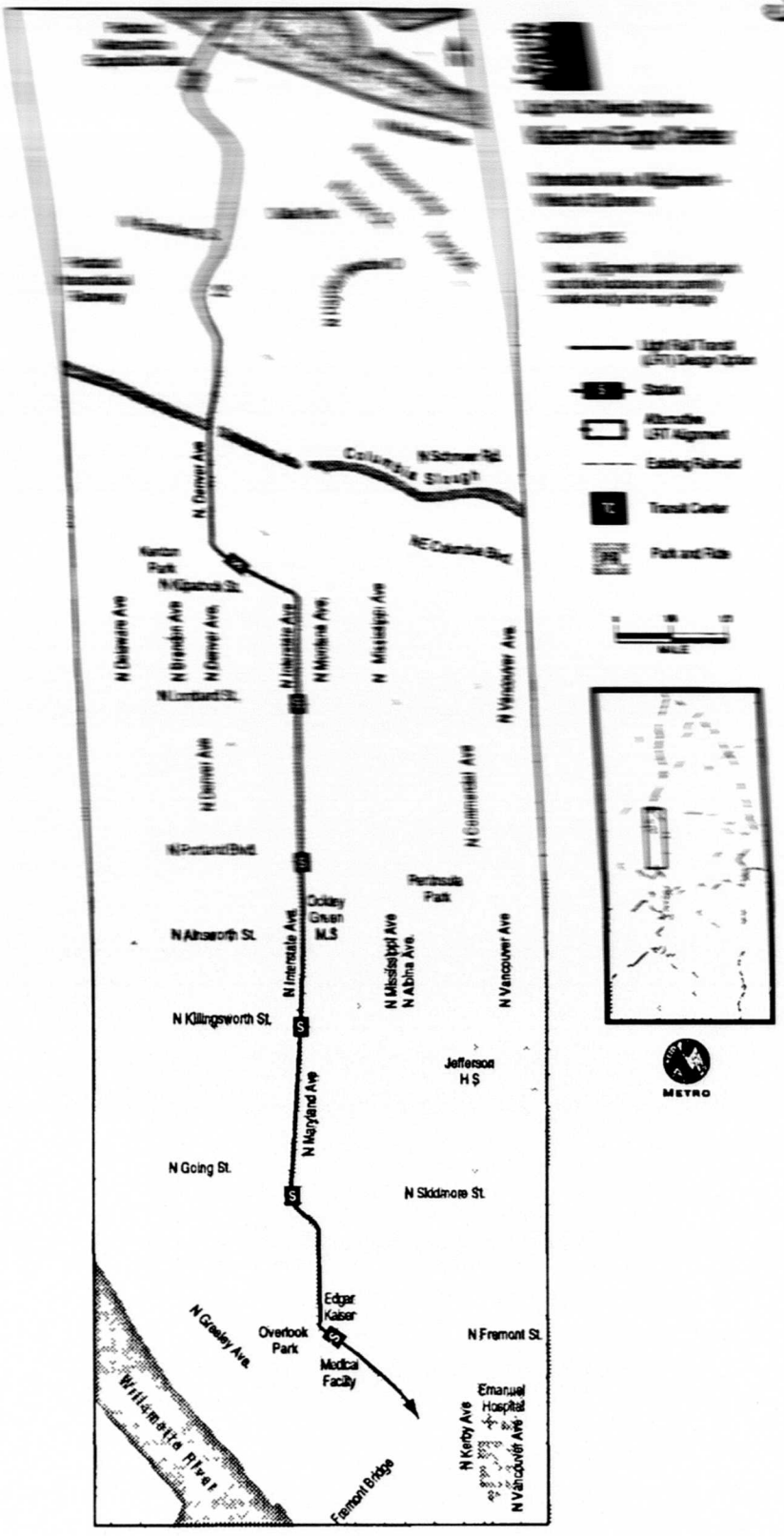

N Denver Ave
N Schmeer St
Columbia Slough
NE Columbia Blvd
Kenton Park
N Kilpatrick St
N Delaware Ave
N Brandon Ave
N Denver Ave
N Interstate Ave
N Montana Ave
N Mississippi Ave
N Vancouver Ave
N Lombard St
N Delaware Ave
N Portland Blvd
N Commercial Ave
Peninsula Park
Overlook Park
N Ainsworth St
N Interstate Ave
N Mississippi Ave
N Albina Ave
N Vancouver Ave
N Killingsworth St
Jefferson HS
N Maryland Ave
N Going St
N Skidmore St
Edgar Kaiser Medical Facility
N Greeley Ave
N Fremont St
Williamette River
Fremont Bridge
N Kerby Ave
Emanuel Hospital
N Vancouver Ave
Light Rail Transit (LRT) Design Option
Station
Alternative LRT Alignment
Existing Railroad
Transit Center
Park and Ride
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

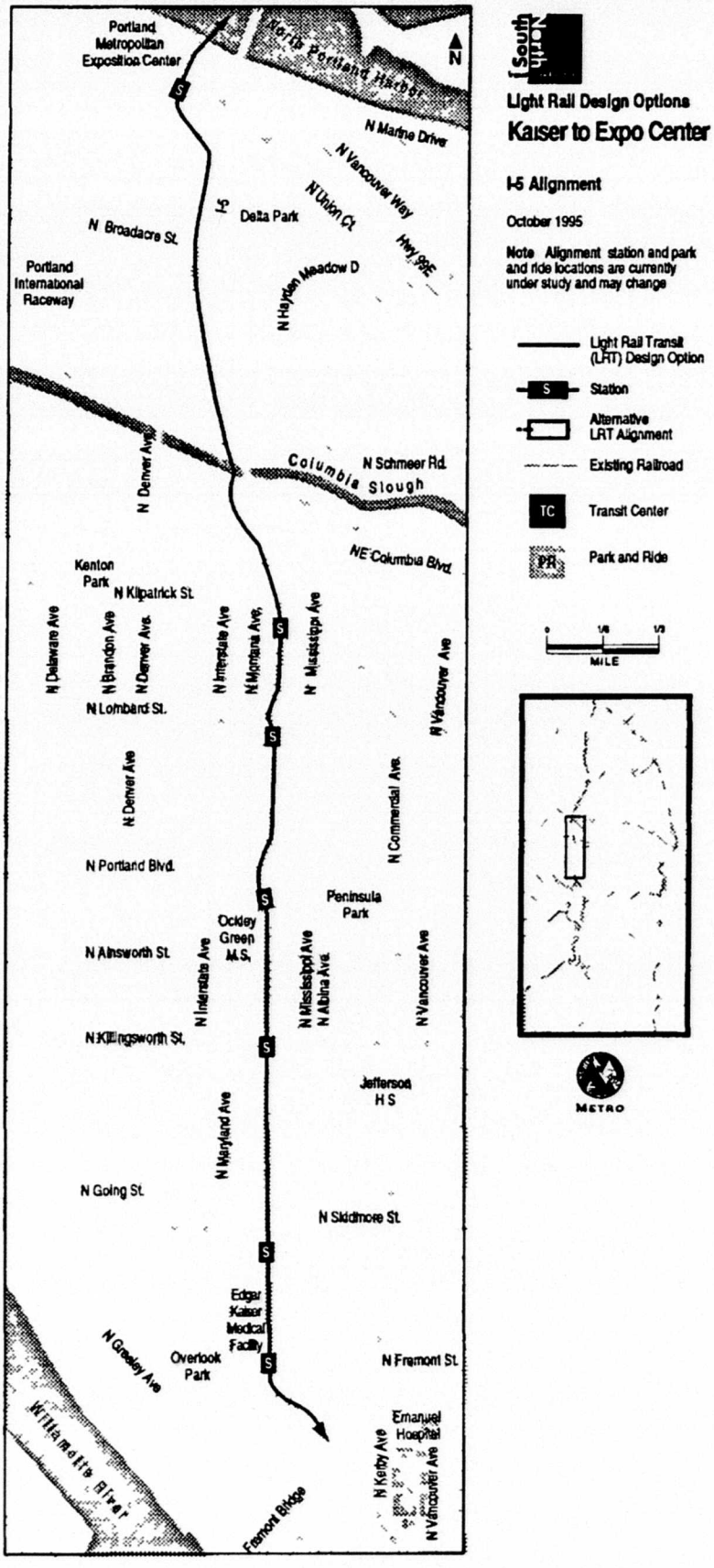
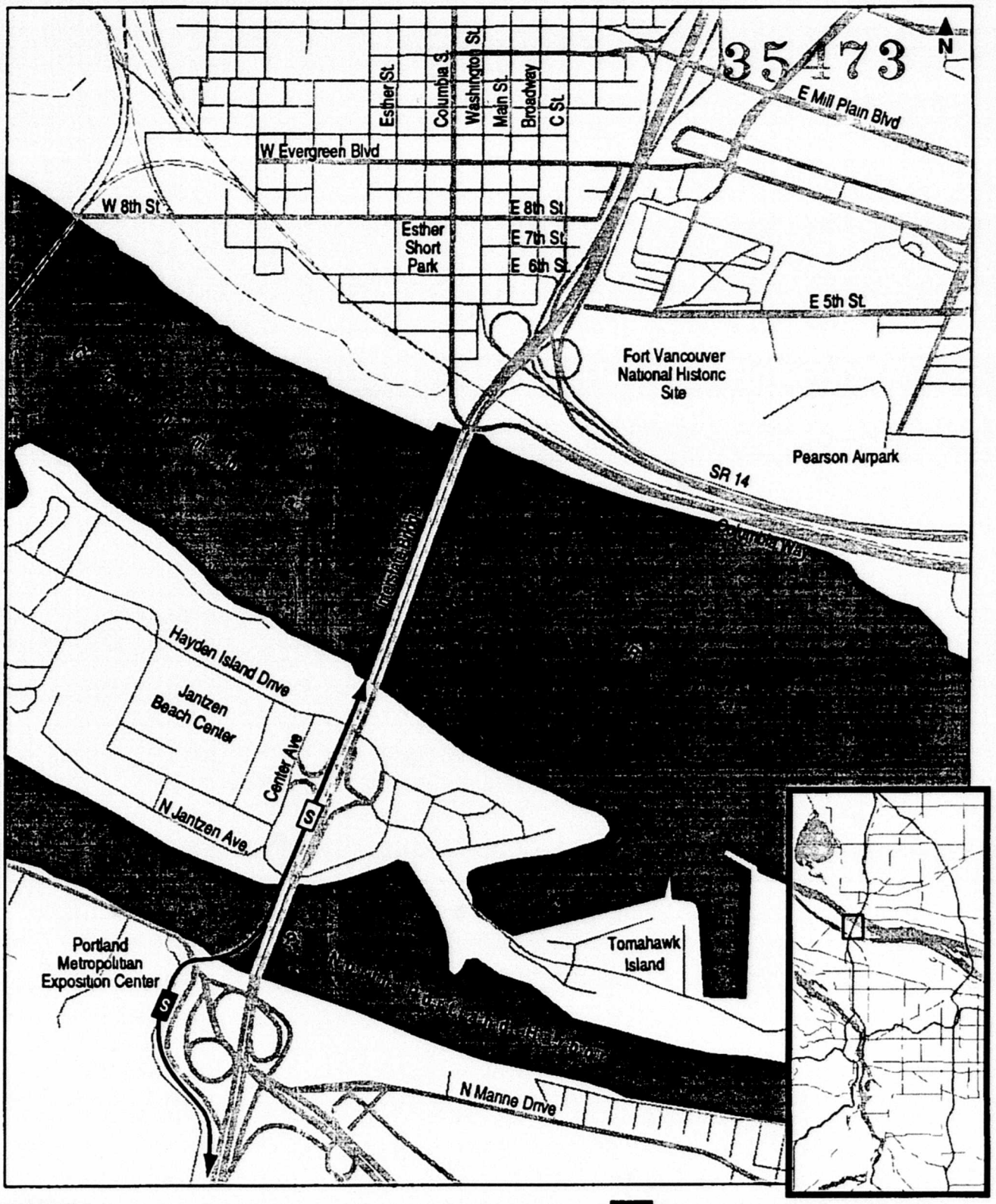

Portland Metropolitan Exposition Center
North Portland Harbor
N
N Marine Drive
N Vancouver Way
N Union Ct
Hwy 99E
I-5
Delta Park
N Broadacre St.
Portland International Raceway
N Hayden Meadow D
N Denver Ave
Columbia Slough
N Schmeer Rd.
NE Columbia Blvd.
Kenton Park
N Kilpatrick St.
N Delaware Ave
N 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
Willamette River
Fremont Bridge
South
North
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
1/8
1/4
MILE
METRO

Figure 10



South North Transit 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

Station

Alternative LRT Alignment

Existing Railroad

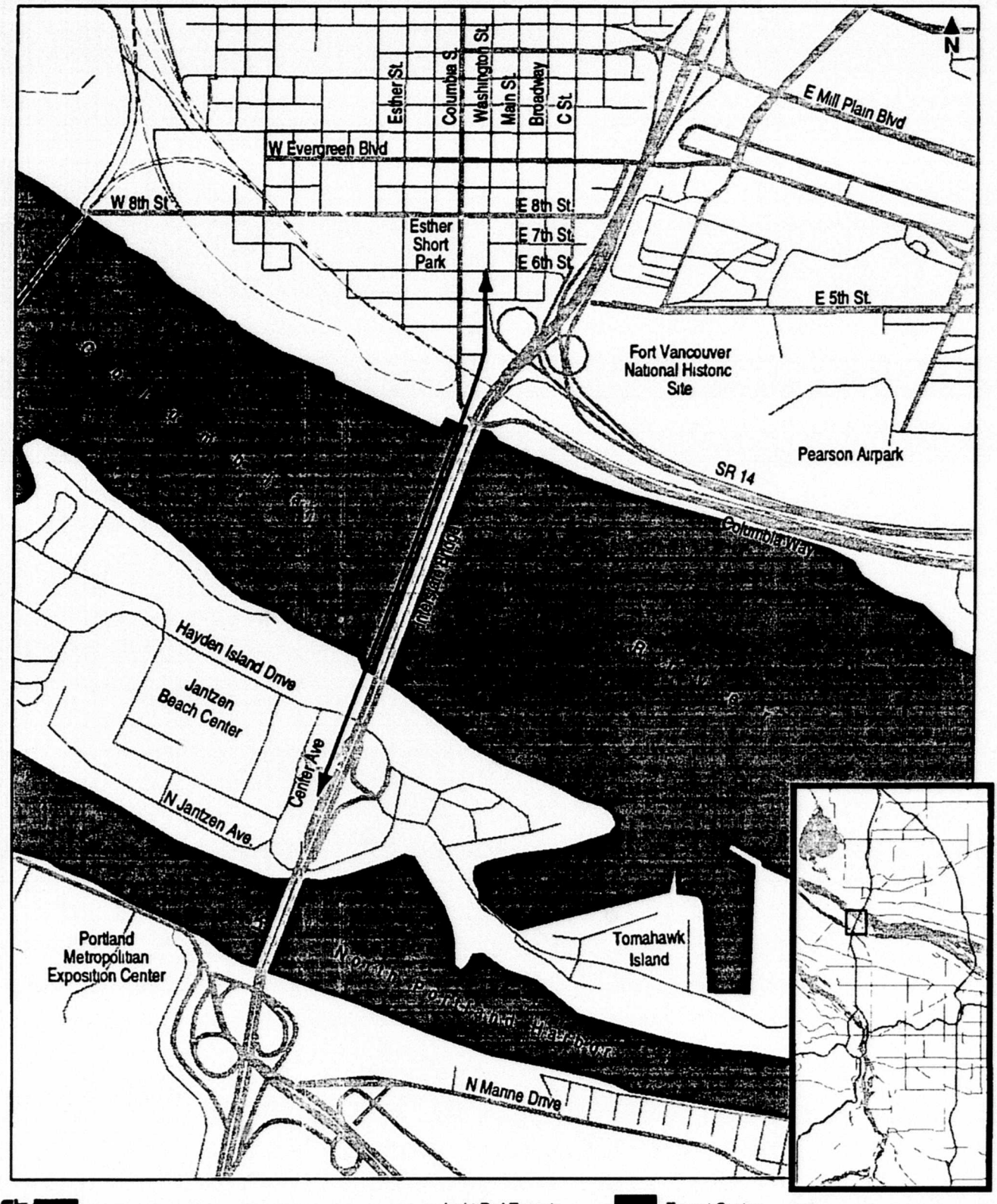
TC Transit Center

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

Columbia River Crossing

Lift Span Bridge

Figure 12

Light Rail Transit (LRT) Design Option

S Station

Alternative LRT Alignment

Existing Railroad

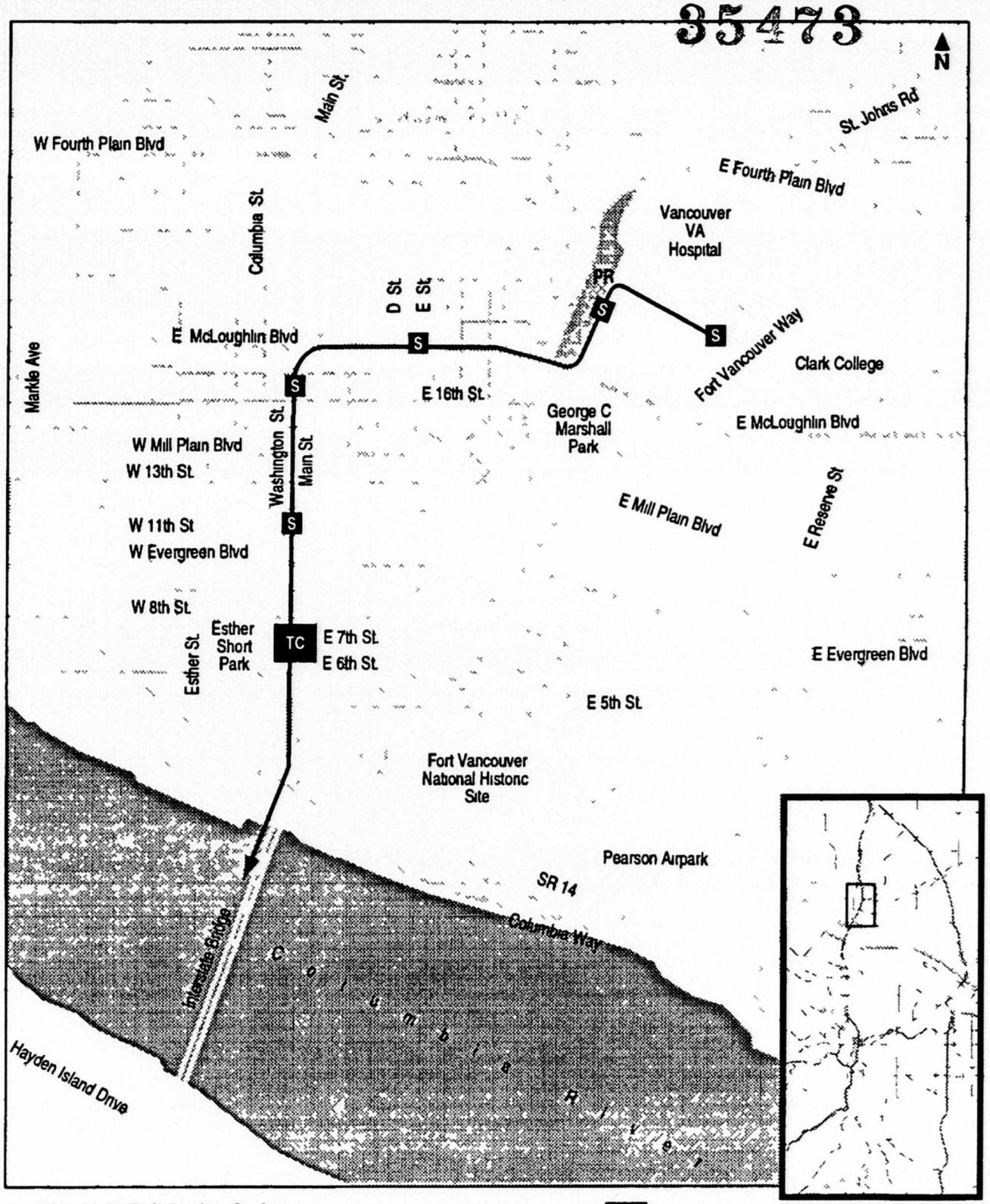
TC Transit Center

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

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 13

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

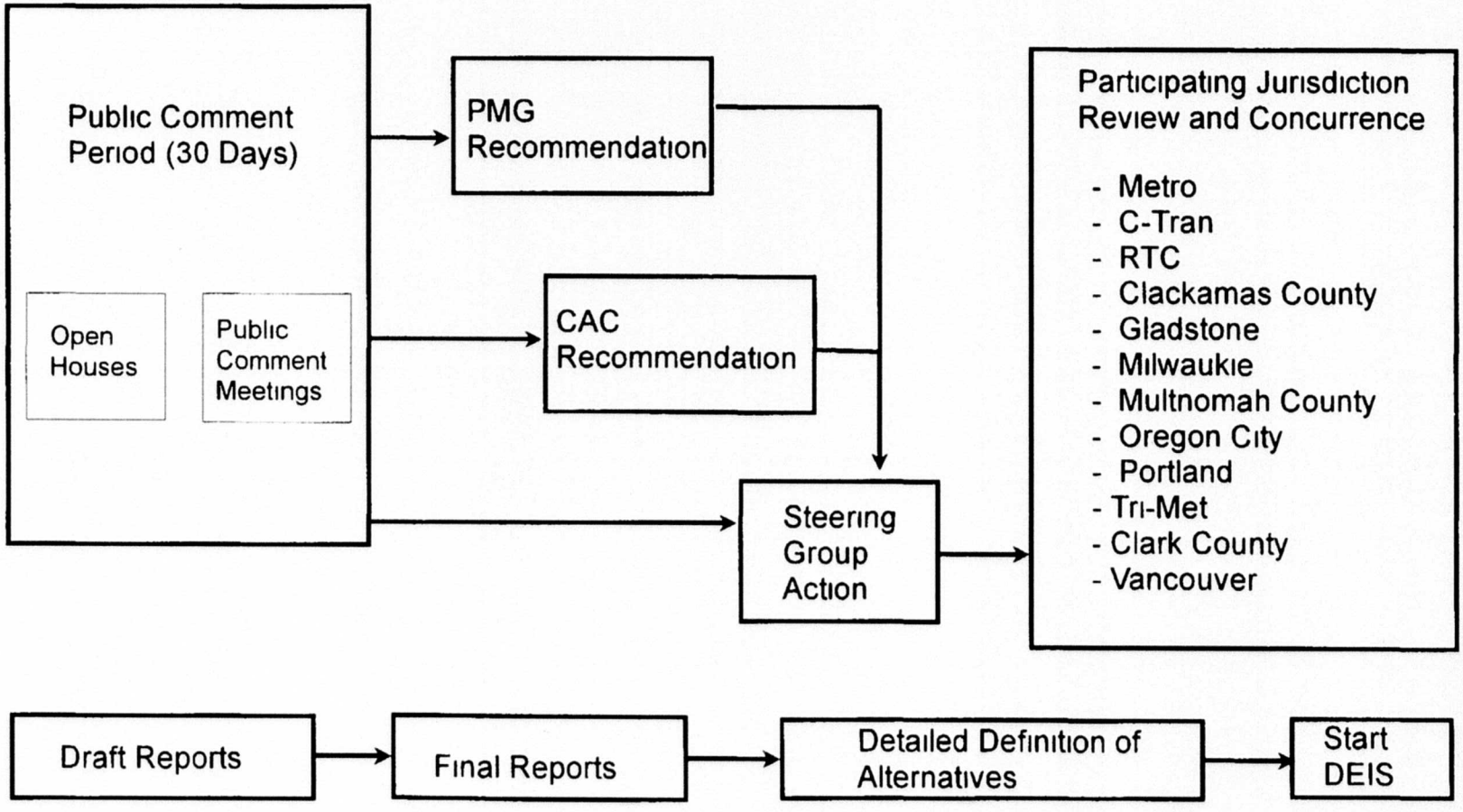
South North
Transit Corridor Study

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**

CTC Mall 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

Southern Terminus 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

Highway 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

Milwaukie 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	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
	County/State/Regional Policies				
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

Eastside Connection 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

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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

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)

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

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Kaiser to 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

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

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

Vancouver CBD to VA 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

35473

Downtown Portland Tier I Final Recommendation Report

South/North Steering Group

November 20, 1995

METRO

Exhibit B

Downtown Portland Tier I Final Recommendation Report

South/North Corridor Transit Study

November 20, 1995

South/North Steering Group

The preparation of this report was financed in part by the U S Department of Transportation, Federal Transit Administration, Oregon Department of Transportation and by the Washington State 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 or the Washington Department of Transportation