PROJECT MANAGEMENT PLAN

May 2010

Columbia River
CROSSING

Title VI

The Columbia River Crossing project team ensures full compliance with Title VI of the Civil Rights Act of 1964 by prohibiting discrimination against any person on the basis of race, color, national origin or sex in the provision of benefits and services resulting from its federally assisted programs and activities.

Americans with Disabilities Act (ADA) Information

If you would like copies of this document in an alternative format, please call the Columbia River Crossing project office at (360) 737-2726 or (503) 256-2726. Persons who are deaf or hard of hearing may contact CRC using Telecommunications Relay Service by dialing 7-1-1.

¿Habla usted español? La informacion en esta publicación se puede traducir para usted. Para solicitar los servicios de traducción favor de llamar al (503) 731-3490.

TABLE OF CONTENTS

List of Figures

Appendices

This page left blank intentionally.

ACRONYMS

AA/EEO	Affirmative Action/Equal Employment Opportunity
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
AGO	Office of the Attorney General
ATU	Amalgamated Transit Union
BIA	Bridge Influence Area
BNSF	Burlington Northern Sante Fe
BRT	Bus Rapid Transit
CADD	Computer-Aided Design and Drafting
CEJG	Community and Environmental Justice Group
CEVP	Cost Estimate Validation Process
CFR	Code of Federal Regulation
CIL	Certifiable Items Lists
CM	Construction Manager
CO	Change Order
CPMS	Capital Program Management System
CPTED	Crime Prevention Through Environmental Design
CRA	Cost Risk Assessment
CRC	Columbia River Crossing
CREM	Cost Risk and Estimate Management
CSS	Context Sensitive Solutions
C-TRAN	Clark County Public Transportation Benefit Area Authority
CVS	Certified Value Specialist
DAP	Design Approval/Acceptance Process
DBE	Disadvantaged Business Enterprises
DBELO	DBE Liaison Officer
DDP	Design Documentation Package

DEA	David Evans and Associates, Inc.
DEIS	Draft Environmental Impact Statement
DHS	Department of Homeland Security
DMV	Department of Motor Vehicles
DSDC	Design Services During Construction
EAC	Estimate at Completion
ECHO	Electronic Clearing House, Inc.
ECRB	External Civil Rights Branch
EIS	Environmental Impact Statement
ETC	Estimate to Complete
FAA	Federal Aviation Administration
FAI	First Article Inspections
FEIS	Final Environmental Impact Statement
FFGA	Full Funding Grant Agreement
FHWA	Federal Highway Administration
FLSSC	Fire/Life Safety and Security Committee
FTA	Federal Transit Administration
FWG	Freight Working Group
HCT	High Capacity Transit
HOV	High Occupancy Vehicle
HR	Human Resources
InterCEP	Interstate Collaborative Environmental Process
IT	Information Technology
LPA	Locally Preferred Alternative
LRT	Light Rail Transit
LRV	Light Rail Vehicles
MA	Master Agreement
MAX	Metropolitan Area Express

MDSG	Marine Drive Stakeholders Group
MOT	Maintenance of Traffic
NEPA	National Environmental Policy Act
NHS	National Highway System
OCIP	Owner-Controlled Insurance Program
ODOT	Oregon Department of Transportation
OEO	Office of Equal Opportunity
OFM	Office of Financial Management
ORS	Oregon Revised Statutes
OTC	Oregon Transportation Commission
PBAC	Pedestrian and Bicycle Advisory Committee
PCM	Project Control Manager
PCO	Potential Change Order
PCRF	Project Change Request Form
PCRO	Project Control and Reporting Office
PDA	Project Development Approval
PDT	Project Development Team
PE	Preliminary Engineering
PG	Project Management Oversight Operating Guidance
PHA	Preliminary Hazard Analysis
PMOC	Project Management Oversight Contractor
PMP	Project Management Plan
PS&E	Plan, Specification, and Estimate
PSC	Project Sponsors Council
PTBA	Public Transportation Benefit Authority
PWG	Portland Working Group
QAPM	Quality Assurance Program Manual
QA/QC	Quality Assurance/Quality Control

RACC	Regional Arts and Cultural Council
RAMP	Real Estate Acquisition Management Plan
RCW	Revised Code of Washington
RE	Resident Engineer
RMO	Risk Management Office
ROD	Record of Decision
ROS	Record of Survey
ROW	Right-of-way
RTC	Regional Transportation Council
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SAPD	Systems Analysis and Program Development
SASS	Sponsor Agency Senior Staff
SAVE	Society for American Value Engineering
SCC	Standard Cost Categories
SEPP	Security and Emergency Preparedness Plan
SR	State Route
SSMP	Safety and Security Management Plan
SSPP	System Safety Program Plan
STHB	Stacked Transit/Highway Bridge
TAC	Technical Advisory Committee
TCC	Total Committed Cost
TDD	Transportation Development
TEAM	Transportation Electronic Award Management
TES	Traction Electrification System
TriMet	Tri-County Metropolitan Transportation District of Oregon
TSA	Transportation Security Administration
UDAG	Urban Design Advisory Group
USC	United States Code

USDOT	United States Department of Transportation
VE	Value Engineering
VWG	Vancouver Working Group
WAC	Washington Administrative Code
WBS	Work Breakdown Structure
WSDOT	Washington State Department of Transportation
WSTC	Washington State Transportation Commission

This page left blank intentionally.

1. Introduction

1.1 Overview of PMP

1.1.1 PMP Document Overview

This section describes the Project Management Plan (PMP) for the Columbia River Crossing (CRC) Project. The overarching purpose of the PMP is to describe what CRC is and how the management structure works. The PMP reflects project managers' desire to deploy resources and expertise in a manner that maximizes efficiency while maintaining overall central control, as well as being responsive and responsible to the public.

This PMP includes a level of detail associated with a project entering the Preliminary Engineering (PE) phase. As more information becomes available, the PMP will be refined and revised. There are many project management decisions ahead.

Managing a multi-billion dollar, multimodal, bi-state transportation project spanning nearly a decade demands an ongoing malleability in responding to organizational needs, legal/policy matters, differing state and local approaches, regulations, federal highway and transit oversight perspectives, shifting politics, rules, and regulations. Over the life of the project, organization lines will be adjusted to meet the needs of each stage of the project, as will roles and responsibilities. State transportation departments and transit agencies will, at some stages, act as partners, and still at other times act as "owner." Appreciating this perspective will be helpful in understanding the PMP. The CRC has specialized skills for delivering products: highway, bridges, and light rail. With this in mind, the PMP is divided into four sections.

- Section 1 – Introduction
    - PMP document overview
    - Project description
    - Project history
    - Objectives and goals
    - Governance and legal authority
- Section 2 – CRC Project Management
    - This section describes the executive management, oversight, integration, and project control functions of the project. CRC Project Management will lead, but not (always) exclusively manage:
        - Organization and staffing
        - Management control (e.g., schedule, scope, document control)
        - Finance (e.g., funding, budget, grant management, reporting)

    - Procurement
    - Public involvement and community relations
    - Environmental studies

- Section 3 – Management/Implementation of Light Rail Transit (LRT)
    - This section describes details related to design, development, construction, testing, and implementation of LRT.
- Section 4 – Management/Implementation of Highway/Bridge
    - This section describes details related to design, development, and construction of the river crossing bridge as well as roadway and interchanges.

1.1.2 Document Purpose

The PMP describes the array of roles and responsibilities, and project management policies and procedures, associated with developing a multi-billion dollar, multimodal, bi-state transportation project. This PMP:

- Addresses the requirements of the Federal Transit Administration (FTA) 5309 New Starts Program.
- Establishes the framework for administering this complex project in accordance with the requirements of Title 49 United States Code (USC) §5309(e)(1)(A), FTA's *Final Rule on Major Capital Investment Projects* of September 2001 and FTA Circular 5200.1A, "Full Funding Grant Agreements Guidance."
- Follows reporting instructions for the Section 5309 New Starts Criteria, prepared by the FTA pursuant to the Transportation Equity Act for the 21st Century (Public Law 105-178 as amended by Title IX of Public Law 105-206).
- Addresses Federal Highway Administration (FHWA) requirements for a PMP contained in section 1904(a) of Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which amends 23 USC 106(h).
- Provides a guideline for the orderly interaction of the multiple agencies, organizations, and staff involved in, and committed to, the CRC.
- Establishes standards by which project performance will be measured.

1.1.3 Maintenance and Updating of the PMP

The PMP will be reviewed and revised bi-yearly or quarterly to reflect major changes, and/or at the initiative of the CRC project managers, FHWA, or FTA. A PMP overhaul reflecting all changes as of the current period will be done on an annual basis and at key review times, such as when the CRC Project applies to enter Final Design. CRC Project Control staff will maintain the PMP and notify all task leads via group email as changes occur. Individual task leads will be responsible for disseminating new PMP information to their staff, as necessary.

Hard copy PMP notebooks will be maintained by the Project Control staff and their distribution will be controlled to ensure that updates are properly maintained.

1.2 Description

1.2.1 Summary Description and Project Need

The CRC is a bridge, transit, and highway improvement project on and near a five-mile segment of Interstate 5 (I-5) that is co-managed by the Oregon and Washington transportation departments in partnership with other project partner agencies. The project area stretches from State Route (SR) 500 in Vancouver, Washington, to approximately Columbia Boulevard in Portland, Oregon, including the Interstate Bridge across the Columbia River. A light rail transit alignment will also extend across from its current terminus at the Expo Center, Portland, Oregon, to Clark College in Vancouver, Washington. More detailed descriptions of highway, bridge, and transit components are found in the subsections below.

The specific needs to be addressed by the project include:

- Growing Travel Demand and Congestion: Existing travel demand exceeds capacity in the I-5 Columbia River crossing and associated interchanges. This corridor experiences heavy congestion and delay lasting 2 to 5 hours during both the morning and afternoon peak travel periods and when traffic accidents, vehicle breakdowns, or bridge lifts occur. Due to excess travel demand and congestion in the I-5 bridge corridor, many trips take the longer, alternative I-205 route across the river. Spillover traffic from I-5 onto parallel arterials such as Martin Luther King Boulevard and Interstate Avenue increases local congestion. The two river crossings currently carry over 260,000 trips across the Columbia River daily. Daily traffic demand over the I-5 crossing is projected to increase by 40 percent during the next 20 years, with stop-and-go conditions increasing to at least 10 to 12 hours each day if no improvements are made.

- Impaired Freight Movement: I-5 is part of the National Truck Network, and is the most important freight freeway on the West Coast, linking international, national, and regional markets in Canada, Mexico, and the Pacific Rim with destinations throughout the western United States. In the center of the project area, I-5 intersects with the Columbia River's deep water shipping and barging as well as two river-level, transcontinental rail lines. The I-5 crossing provides a direct and important highway connection to the Port of Vancouver and Port of Portland facilities located on the Columbia River, as well as the majority of the area's freight consolidation facilities and distribution terminals. Freight volumes moved by truck to and from the area are projected to more than double over the next 25 years. Vehicle hours of delay on truck routes in the Portland-Vancouver area are projected to increase by more than 90 percent over the next 20 years. Growing demand and congestion will result in increasing delay, costs, and uncertainty for all businesses that rely on this corridor for freight movement.

- Limited Public Transportation Operation, Connectivity, and Reliability: Due to limited public transportation options, a number of transportation markets are not well served. The key transit markets include trips between the Portland Central City and the City of Vancouver and Clark County, trips between North/Northeast Portland and the City of

Vancouver and Clark County, and trips connecting the City of Vancouver and Clark County with the regional transit system in Oregon. Current congestion in the corridor adversely impacts public transportation service reliability and travel speed. Southbound bus travel times across the bridge are currently up to three times longer during parts of the a.m. peak period compared to off-peak periods. Travel times for public transit using general purpose lanes on I-5 in the Bridge Influence Area are expected to increase substantially by 2030.

- Safety and Vulnerability to Incidents: The I-5 river crossing and its approach sections experience crash rates nearly 2.5 times higher than statewide averages for comparable facilities. Incident evaluations generally attribute these crashes to traffic congestion and weaving movements associated with closely spaced interchanges. Without breakdown lanes or shoulders, even minor traffic accidents or stalls cause severe delay or more serious accidents.
- Substandard Bicycle and Pedestrian Facilities: The bike/pedestrian lanes on the I-5 Columbia River bridges are 6 to 8 feet wide – narrower than the 10-foot standard – and are located extremely close to traffic lanes, thus impacting safety for pedestrians and bicyclists. Direct pedestrian and bicycle connectivity is poor in the Bridge Influence Area (BIA).
- Seismic Vulnerability: The existing I-5 bridges are located in a seismically active zone. They do not meet current seismic standards and are vulnerable to failure in an earthquake.

1.2.2 LRT Project Description

An integrated piece of the CRC is the proposed LRT extension into Vancouver, Washington. This is an expansion of Portland's existing system, specifically the Yellow Line MAX, which currently terminates at Expo Center, short of the Columbia River and approximately 1.5 miles from downtown Vancouver, Washington. While the Washington State Department of Transportation (WSDOT) is the designated New Starts grantee, the CRC is expected to draw from Tri-County Metropolitan Transportation District of Oregon (TriMet)'s substantial experience developing light rail in the Portland region, embedding TriMet staff in the CRC management structure co-located in the CRC project office, and drawing on TriMet procedures and techniques where appropriate.

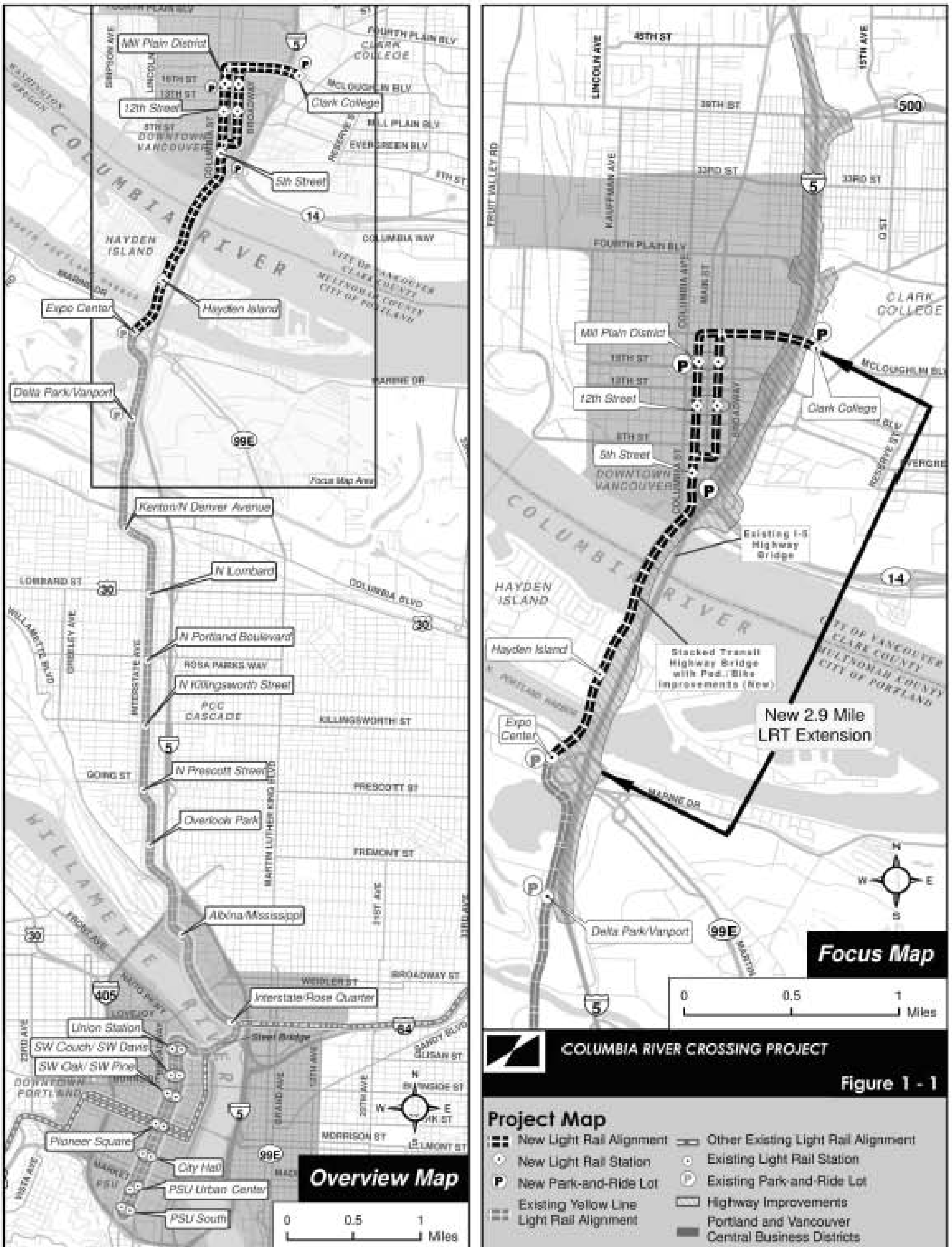
The final specifications for LRT will be determined with extensive public input through PE and final design, as well as design guidelines and standards for TriMet, Clark County Public Transportation Benefit Area Authority (C-TRAN), and WSDOT and discussions among local, state, and federal partners.

1.2.2.1 The Locally Preferred Alternative

The Locally Preferred Alternative (LPA) [see Figure1-1] will begin at the northernmost station of TriMet's current Yellow Line Expo Center Station and extend approximately 2.8 miles across the North Columbia Harbor, through Jantzen Beach in Oregon, across the Columbia River, through downtown Vancouver, Washington, ending near Clark College. The following description of the alignment is divided into the three segments of Oregon, the river crossing, and Washington. The alignment is described as beginning at the Expo Center and progressing northward to the end of construction at Clark College.

This page left blank intentionally.

Figure 1-1. LRT Project Map



*Note: Stations and Light Rail Transit alignment from the Steel Bridge to PSU South are currently under construction as part of the 1.8-mile Portland Mall Light Rail Project. Upon completion in September of 2009, these stations will serve Green and Yellow line trains.

08/21/08

The LRT alignment will extend northward from the existing stub end tracks at Expo Center Station. A double track alignment including a Northbound and Southbound guideway will be constructed. The alignment will curve toward I-5 as it passes beneath a newly constructed Marine Drive. North of Marine Drive, the profile will rise as the guideway transitions onto a bridge structure to cross the North Columbia Harbor. The bridge curves to the northeast to bring the LRT alignment along the western edge and adjacent to the new I-5 improvements through Jantzen Beach. An LRT station will be constructed on Jantzen Beach. The alignment will extend northward on Jantzen Beach along the western edge of I-5 until it transitions onto the new Columbia River Bridge. The guideway will pass over several roads on Jantzen Beach, including North Jantzen Avenue and North Hayden Island Drive. There are no at-grade road crossings proposed in this segment. The length of this segment between the existing Expo Center station and the beginning of the new Columbia River Bridge on the Oregon side of the river is approximately 0.7 miles.

The LRT guideway transitions from its own alignment onto a new combination highway and/or LRT bridge. The new Columbia River crossing will consist of either two or three bridges. The profile of the new bridges will be designed to provide vertical clearance to permit barge and ship traffic to pass without a lift or movable span. The length of the Columbia River bridge is approximately 0.9 miles, including 0.5 miles over water and 0.4 miles in the approaches (0.2 miles on the Oregon side and 0.2 miles on the Washington side).

After the Columbia River crossing, LRT curves north onto a structure. The double track guideway profile drops and is aligned to touch grade in Vancouver's Washington Street. The first cross street grade crossing will be at 5th Street. The double guideway alignment will head north to either 6th Street or 7th Street where the northbound guideway will curve away from Washington Street and run two blocks east to Broadway where it will enter the right-of-way for Broadway Street. The LRT alignment will then be aligned to form a couplet with the southbound guideway on Washington Street and the northbound guideway on Broadway Street. The total length of double track guideway between the Columbia River Bridge and the point where it becomes a couplet is approximately 0.2 miles.

The couplet will extend north from either 6th Street or 7th Street, running as a single track in the roadways of Broadway Street for northbound, Washington Street for the southbound. The couplet arrangement will end after 11 or 12 blocks north to McLoughlin Boulevard. There will be three stations through the downtown Vancouver segment on both Washington and Broadway streets. The LRT alignment may include park-and-ride lots to serve the stations at both the southern and/or northern ends of the couplet alignment through Vancouver. The length of single track guideway is approximately 0.6 miles in both Washington and Broadway Streets (1.3 miles of single guideway construction).

Once entering the right-of-way of McLoughlin Street, both northbound and southbound alignments curve to the east with double track guideway running east of Broadway Street in the median of McLoughlin Boulevard. The double guideway alignment continues eastward approximately nine blocks crossing under I-5 and ends at a station in or near McLoughlin Boulevard and east of I-5. This station is on the western boundary of Clark College and will include a park-and-ride lot. The length of double track guideway in McLoughlin Boulevard is approximately 0.6 miles.

The total length includes 0.7 miles of double track guideway in Oregon, 0.9 miles of bridge over the Columbia River, 0.8 miles of double track guideway and 0.6 miles of couplet (1.3 miles of single track guideway) in Vancouver. The total length of the alignment is approximately 3 miles.

Continued development of the LPA will include interfacing with both the highway design team and also community groups formed to help make recommendations and develop context sensitive solutions. The transit development will specifically rely on recommendations from the Urban Design Advisory Group (UDAG), Vancouver Working Group (VWG), Portland Working Group (PWG), and Pedestrian and Bicycle Advisory Committee (PBAC), and Community and Environmental Justice Group (CEJG) described further in Section 2.7.6.3.

1.2.2.2 Light Rail Vehicles

There are 16 light rail vehicles (LRVs) needed to meet forecast ridership. PE will include an evaluation of the Type 4 vehicles purchased for TriMet’s South Corridor Project. The evaluation will be studying the interface with the Portland-Milwaukie LRT project (also progressing towards Final Design) and potential cost-saving efficiencies gained through coordinating LRV work between the two projects. LRVs operating on the alignment will be in two car consists.

1.2.2.3 Maintenance Facility and Operations Control Center

PE will include a study of operating and maintenance needs with an expectation that TriMet’s existing facility, Ruby Junction, in Gresham will require changes. Currently, there are two light rail expansion projects underway, the Portland-Milwaukie and CRC. If both of these proceed to construction, then the following changes are expected at Ruby Junction:

- LRV Storage Tracks for 2030
  - Add 19 to 39 new spaces at Ruby Junction on about 10.5 acres of land acquired with project funds.
- LRV Maintenance Bays for 2030
  - Relocate the wash bay to make room for added maintenance bays.
  - Add six pit and platform bays on the west side of the existing main shop building.
- Add parking spaces, restrooms, locker rooms, and lunchroom space for new operations and maintenance personnel.
- Add outdoor storage for maintenance materials.
- TriMet staff members who are assigned and co-located in the CRC project office are tasked with transit design and coordination with the Milwaukie project design team. John Griffiths (see TriMet Org Chart, Figure 3-1) at TriMet will act as the single point of contact for design review of the Ruby Junction Expansion for both CRC and Portland to Milwaukie LRT to ensure that there is one point of contact for both projects. Once the project advances to Preliminary Engineering a process will be developed for ongoing coordination as needed.

1.2.2.4 Long-Term Service Operations and Maintenance

TriMet will operate the light rail service through IGA with C-TRAN to be developed prior to Start Up. Maintenance of facilities such as park and rides will need to be a part of the IGA.

1.2.3 Highway and Bridge Project Description

The BIA stretches from SR 500 in Vancouver, Washington, to approximately Columbia Boulevard in Portland, Oregon, including the Interstate Bridge across the Columbia River. The project will improve the interstate and associated interchanges within the project area.

1.2.3.1 The Locally Preferred Alternative

The locally preferred alternative for the highway portion of the CRC includes a replacement river crossing and improvements to five miles of I-5, including seven interchanges. A partial interchange improvement will be made at Victory Boulevard. in Portland, Oregon, addressing the southbound on-ramp overcrossing Victory Boulevard. Full improvements will be made to Marine Drive, Hayden Island, SR 14, Mill Plain, 4th Plain, and the SR 500 interchanges.

1.2.3.2 River Crossing

The river crossing would replace the existing bridges with a new crossing downstream (west) of the current I-5 alignment. The existing bridges would be removed. A final decision is pending on whether the replacement option would consist of two or three bridges. The three-bridge option would include two bridges for I-5 northbound and southbound lanes, and a third bridge to carry LRT, pedestrians, and bicycles. The two-bridge option would require a “Stacked Transit/Highway Bridge” (STHB) design, including transit beneath the highway deck of the I-5 southbound bridge, and would suspend the bicycle and pedestrian path under one edge of the replaced bridge.

Bridge design will be determined during the PE and final design phases, but the basic size and height requirements have been defined. The bridge spans over the river must be tall enough for large barges and tugboats to pass underneath without the need for a lift span (approximately 90 feet vertical clearance), and low enough to avoid interference with aircraft using the nearby Pearson Field or Portland International Airport. Safety shoulders will be included on both sides. Traffic lanes and safety shoulders are determined to be 12-foot widths. The exact number of traffic lanes the bridge will support is currently a needed key decision. Recommendations are being made from the Project Sponsors Council (PSC) and other stakeholders (see Section 2.7.6).

The river crossing is the single largest feature of this project, and CRC must balance the constraints with desire and need. Context-sensitive solutions are currently being explored to unite the technical needs with community desires. CRC is currently in the process of determining the resulting bridge design. The process begins with a technical screening of all bridge types. This screening includes technical bridge experts to narrow bridge type options based on the physical constraints of the project location and bridge evaluation criteria. A second bridge screening study will be held for bridge aesthetics and community context. Recommendations from the technical and aesthetic bridge screening studies will be presented to PSC, UDAG, and other stakeholders for consensus. A preferred option(s) is anticipated to emerge from these coordination efforts and be carried into a preliminary Type, Size, and Location study and included into the Final Environmental Impact Statement (FEIS).

1.2.3.3 Highway / Interchanges

The highway improvements included with the replacement river crossing would provide additional auxiliary lanes. Currently, the number of lanes is a key decision needed to proceed with the FEIS. There is an interest in two separate options identified as the 10- and 12-lane options. CRC staff is working with the PSC and other stakeholder groups to develop a recommendation on the number of lanes that will extend across the river. Technical data is distributed to PSC and other groups for input and recommendations on a preferred roadway option (additional information regarding the function and flow of information between CRC and the various stakeholder/technical groups is found in Section 2.7.6). The replacement crossing will provide three through lanes in each direction from Marine Drive to SR 500, but will differ in the number of auxiliary lanes provided and in the design of some interchanges. The number of auxiliary lanes is the primary difference between the 10- and 12-lane options. There may be two or three auxiliary lanes in each direction between Marine Drive and SR 500.

Victory Boulevard

The southern extent of highway improvements is at the Victory Boulevard/I-5 vicinity. Minor improvements will be made to the I-5 bridge overcrossing Victory Boulevard. A dedicated ramp from the Marine Drive/I-5 interchange will extend south from Marine Drive to I-5 southbound and tie into the improvements (currently under construction) from the Oregon Department of Transportation (ODOT) I-5/Delta Park widening project.

Marine Drive

The Marine Drive/I-5 interchange will remain in the same general vicinity. Currently, recommendations for the interchange location and the configuration of Marine Drive are received through the Marine Drive Stakeholder Group and the Marine Drive Technical Committee. Merge lanes for southbound traffic entering the highway from Marine Drive would be extended past Victory Boulevard. A new roadway would cross over Vancouver Way to connect Marine Drive and Martin Luther King, Jr. Boulevard. There are several design options to be studied for the Marine Drive interchange. A preferred option is anticipated prior to completing the FEIS.

Hayden Island

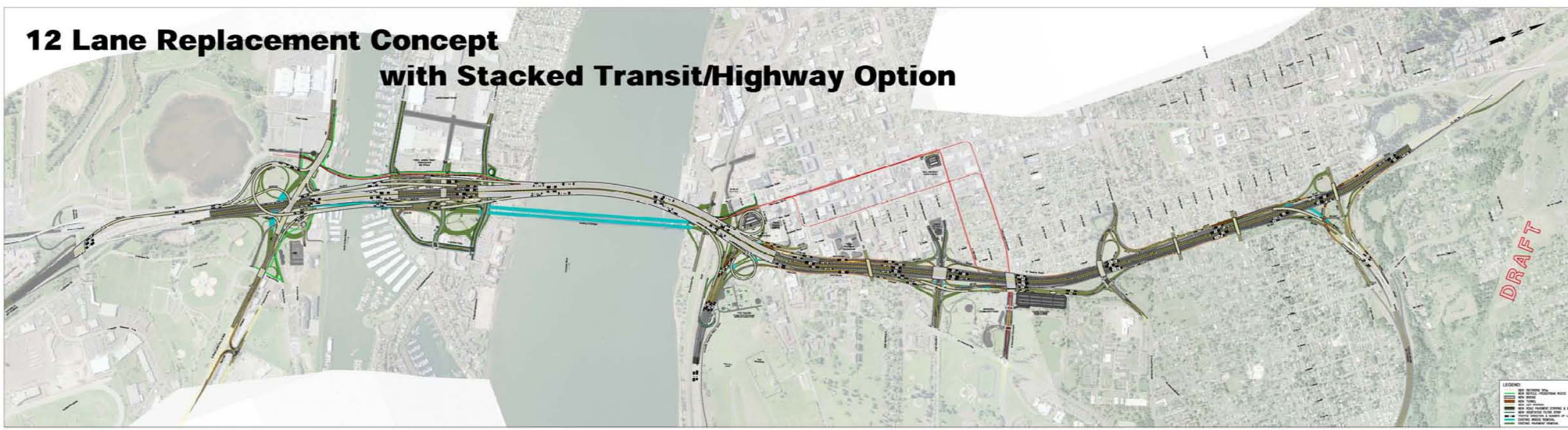
The Hayden Island interchange would use ramps parallel to the mainline, rather than looped ramps to minimize the east-west footprint of the highway. Local streets on Hayden Island near I-5 would be modified to connect with the redesigned I-5 interchange. Hayden Island Drive and Jantzen Drive would be widened to two lanes in each direction to connect with Jantzen Beach Center and provide circulation around the I-5 interchange. Tomahawk Island Drive would be extended to run underneath I-5 and provide a connection between the eastern half of the island and Jantzen Beach. The City of Portland recently prepared a new land use plan for Hayden Island, which could revise local circulation and connections to the Hayden Island interchange. A final preferred option is anticipated prior to completing the FEIS.

This page left blank intentionally.

Figure 1-2. 10-Lane Replacement Concept

This page left blank intentionally.

Figure 1-3. 12-Lane Replacement Concept



This page left blank intentionally.

SR 14

The SR 14 interchange would be rebuilt to allow direct access (no stop signs or signals) between I-5 and SR 14 in all directions.

Mill Plain

The Mill Plain interchange would use on- and off-ramps running parallel to the mainline, similar to the design on Hayden Island.

Fourth Plain

This interchange design would include on- and off-ramps for traffic exiting or entering I-5 southbound. Northbound exits to Fourth Plain Boulevard would use the off-ramp at the Mill Plain Boulevard interchange. A rebuilt Fourth Plain overpass would accommodate the additional width of I-5. A new access road would connect the Clark College Park-and-Ride to the Fourth Plain interchange and allow northbound entrances onto I-5.

SR 500

The SR 500 interchange would be rebuilt to provide free-flow movements in all directions between SR 500 and I-5. A tunnel running under the I-5 mainline and other interchange ramps would connect southbound I-5 to SR 500. Highway improvements would continue north to the Kiggins Bowl vicinity where the new auxiliary lane(s) would merge with the existing three through lanes. Southbound I-5 traffic would not access 39th Street directly from this interchange, but could do so from the preceding Main Street off-ramp.

1.2.3.4 Maintenance and Operations

WSDOT, ODOT, the city of Vancouver, and the city of Portland all have established roadway maintenance and operations facilities that will operate and maintain CRC after its construction. Each agency will be responsible for maintaining elements of the roadway within their respective jurisdictions, unless inter-local agreements between jurisdictions prevail. The majority of the maintenance and operations resources are already provided for, as the roadway facility already exists and CRC is replacing and updating the facility. However, care and coordination are needed with the respective maintenance program managers to plan and program additional funding or reallocate resources that may be necessary to maintain and operate new features such as stormwater facilities, additional lane miles from widening, fewer personnel needed to operate the bridge, etc.

CRC will include and coordinate with the maintenance staff and managers during all phases of design. Maintenance personnel are anticipated to identify existing chronic problems on their facilities so that those issues will not occur or will be corrected with the new design. Maintenance personnel will also provide insight on the development of facilities to ensure access, safety, and the ability to maintain are accounted for in the design. Maintenance program managers will be included so they can adequately plan for additional or reduced resources when forecasting budget and workforce. However, the individual agencies will be responsible for planning, requesting, and procuring funds to maintain the improvements.

A detailed summary of maintenance coordination, operations, and planning is discussed in Section 4.5.

1.3 Project History

1.3.1 Summary of the Project Background

- 1990-1998: Bi-State High Capacity Transit (HCT) Studies
  - Several HCT studies were performed in the 1990s related to the possibility of providing a form of HCT between Oregon and Washington. The following is a list of those studies:
    - Clark County HCT Analysis – 1990
    - South/North I-5/I-205 HCT Pre-AA – 1993
    - South/North I-5 LRT Draft Environmental Impact Statement (DEIS) – 1996
    - Commuter Rail and High Occupancy Vehicle (HOV) Studies – 1998
- 1999-2000: I-5 Trade Corridor Study
  - In 1999, a preliminary assessment for the I-5 corridor began to evaluate problems on the corridor and a range of solutions. The study concluded with the following general recommendations:
    - Unacceptable economic impacts and congestion will result if no corrective action is taken.
    - Solution must be multimodal.
    - Improvements to the I-5 corridor will require new funds.
    - Region must promote transportation-efficient development.
- 2001-2002: I-5 Transportation and Trade Partnership
  - In 2001, the governors of Oregon and Washington formed a bi-state partnership to study transportation problems and possible solutions for the I-5 corridor. The Partnership recommended fixing three bottlenecks in its 2002 Strategic Plan:
    - I-5 at Salmon Creek in Clark County (completed in 2006)
    - I-5 at Delta Park in Portland (under construction now-2009)
    - I-5 at the Columbia River (this project)
- Spring 2005: CRC project begins
  - The 39-member CRC Task Force was formed in early 2005 to advise the CRC project on key decisions. The CRC Task Force consists of leaders from a broad cross section

of Oregon and Washington communities, including public agencies, businesses, civic organizations, neighborhoods, freight, commuter, and environmental groups.

  - CRC Project Team formed around a nucleus of WSDOT and ODOT staff to include project partners including TriMet, C-TRAN, Regional Transportation Council (RTC), Metro, and the Cities of Vancouver and Portland.

- Fall 2005: Defining the problems and potential solutions
  - Using data developed by the I-5 Transportation and Trade Partnership, CRC worked with the public to define the problems and needs in the project area. Twenty-three river crossing and 14 transit ideas were proposed as potential solutions, and evaluation criteria was developed.
- Spring 2006: Narrowing the ideas
  - Continuing discussions with the Task Force and community, the CRC project team studied the river crossing and transit ideas. As a result of this discussion and analysis, the ideas were further narrowed to a set of four river crossing options and five public transit options.
- Spring-Summer 2006: Testing the preliminary alternatives
  - CRC packaged the most promising bridge and transit options into a dozen preliminary alternatives. Each alternative included several transportation components: bridge, highway, transit, freight, bicycle, and pedestrian improvements, and strategies to reduce travel demand. These preliminary alternatives were tested against the evaluation criteria. The results highlighted the strengths and weaknesses of the components.
- Fall 2006-Spring 2007: Identifying DEIS alternatives
  - In collaboration with partner agencies, the CRC identified five project alternatives and recommended these for further analysis in the DEIS.
- Spring-Fall 2007: Analyzing the five alternatives
  - The CRC project analyzed each alternative to determine how well it relieves congestion and improves safety and mobility on I-5. The five alternatives are:
    - Replacement bridge with bus rapid transit (BRT)
    - Replacement bridge with light rail transit
    - Supplemental bridge with bus rapid transit
    - Supplemental bridge with light rail transit
    - No build (for comparison purposes)

- Spring 2008: DEIS was released on May 2, 2008
    - The DEIS was released on May 2, 2008, with a 60-day comment period. Over 1,600 comments were received during this period.
- Summer 2008: LPA selected
    - The partnering agencies: TriMet, C-TRAN, City of Vancouver, City of Portland, Metro, and RTC, selected an LPA in late July 2008 that consists of a replacement bridge with light rail transit ending at Clark College. This alignment has been adopted into the regional transportation plans for both parts of the region.

1.4 Objectives and Goals

1.4.1 Objectives

To address the transportation problems on I-5, a mix of bridge, public transit, and highway solutions are needed. The object is to improve:

- Travel safety and traffic operations at the I-5 river crossing and nearby interchanges.
- Connectivity, reliability, travel times, and operations of the public transportation systems in the project area.
- Freight mobility and address interstate travel and commerce needs in the project area.
- Structural integrity of the I-5 river crossing.

1.4.2 Goals

In addition, the CRC team is dedicated to achieving the following goals:

- Develop a financially feasible design that enhances public safety while being sensitive to aesthetic, cultural, and environmental resources, and reflecting community values.
- Identify realistic and achievable approaches to contracting construction and project financing.
- Complete the project:
    - On time
    - Within budget
    - Without litigated claims
    - In a safe manner for both the individuals working on the project and for the traveling public
    - In a manner in which the public trust, support, and confidence in the project will be maintained

1.5 Governance

1.5.1 Legal Authority

The WSDOT and ODOT entered into a partnership to jointly manage the Columbia River Crossing Project, WSDOT, acting by and through the Secretary of Transportation, and ODOT acting by and through the Oregon Transportation Commission. WSDOT is authorized by:

- The Revised Code of Washington (RCW) 47.52.020, Powers of Highway authorities — State facility, county road crossings
- RCW 39.34.030, Joint powers – Agreements for joint or cooperative action, requisites, effect on responsibilities of component agencies – financing of joint projects

ODOT is authorized by:

- The Oregon Revised Statutes (ORS) 190.410 to 190.440 – 190.420, Authority of public agency to make agreements with public agencies in other states; contents of agreement; liability of public agency
- ORS 381.005 to 381.820, Interstate bridges under state jurisdiction

TriMet is authorized by:

- ORS 267.010 though and including 267.430
- Code of Tri-County Metropolitan Transportation District of Oregon

C-TRAN is authorized by:

- RCW 36.57A, Public Transportation Benefit Areas (PTBA)

This page left blank intentionally.

2. CRC Project Management

2.1 Organization and Staffing

2.1.1 Columbia River Crossing Agency Roles and Responsibilities

The CRC Project requires partnering involving two federal oversight agencies, two states, two cities, two transit agencies, and two metropolitan planning organizations. The overall success of the CRC project development and implementation will rely heavily on coordination between partners and integrating each agency's specific experience and best practices to deliver one unified project solution. The individual roles and responsibilities of the partnering agencies are listed below. These roles and responsibilities will be updated as the project and partnering relationships evolve through the development of this project.

2.1.1.1 Agency Roles and Responsibilities

- FTA
  - Oversight for CRC Transit Design
  - Together with FWHA, oversight and approval for CRC environmental compliance
- FHWA
  - Oversight for the Highway Design
  - Together with FTA, oversight and approval for CRC environmental compliance
- WSDOT
  - Grantee and lead contractor for the project
  - Control of agreements and project fiduciary responsibilities
  - Together with ODOT, management of design development and implementation of the CRC highway and bridge components
  - Together with ODOT, management of CRC environmental compliance
- ODOT
  - Together with WSDOT, management of design development and implementation of CRC highway and bridge components
  - Together with WSDOT, management of CRC environmental compliance
- TriMet
  - Together with C-TRAN, management of design development and implementation of the CRC Transit Design components. Also includes determination of maintenance and operations for proposed transit components.

 - Advise WSDOT on grantee requirements for FTA New Starts Application Process and Full Funding Grant Agreement (FFGA) process.

- C-TRAN
  - Together with TriMet, management of design development and implementation of the CRC Transit Design components. Also includes determination of maintenance and operations for proposed transit components.
- City of Portland
  - Provides input and guidance related to local facility design in Portland
  - Concurrence and approval of design elements affecting their jurisdiction
  - Provides input and guidance for local coordination and community involvement in Portland
  - Provides input for transit planning in Portland
- City of Vancouver
  - Provides input and guidance related to local facility design in Vancouver
  - Concurrence and approval of design elements affecting their jurisdiction
  - Provides input and guidance for local coordination and community involvement in Vancouver
  - Provides input for transit planning in Vancouver
- RTC
  - Together with Metro, provides oversight and concurrence for traffic modeling and travel demand forecasts
- Metro
  - Together with RTC, provides oversight and concurrence for traffic modeling and travel demand forecasts

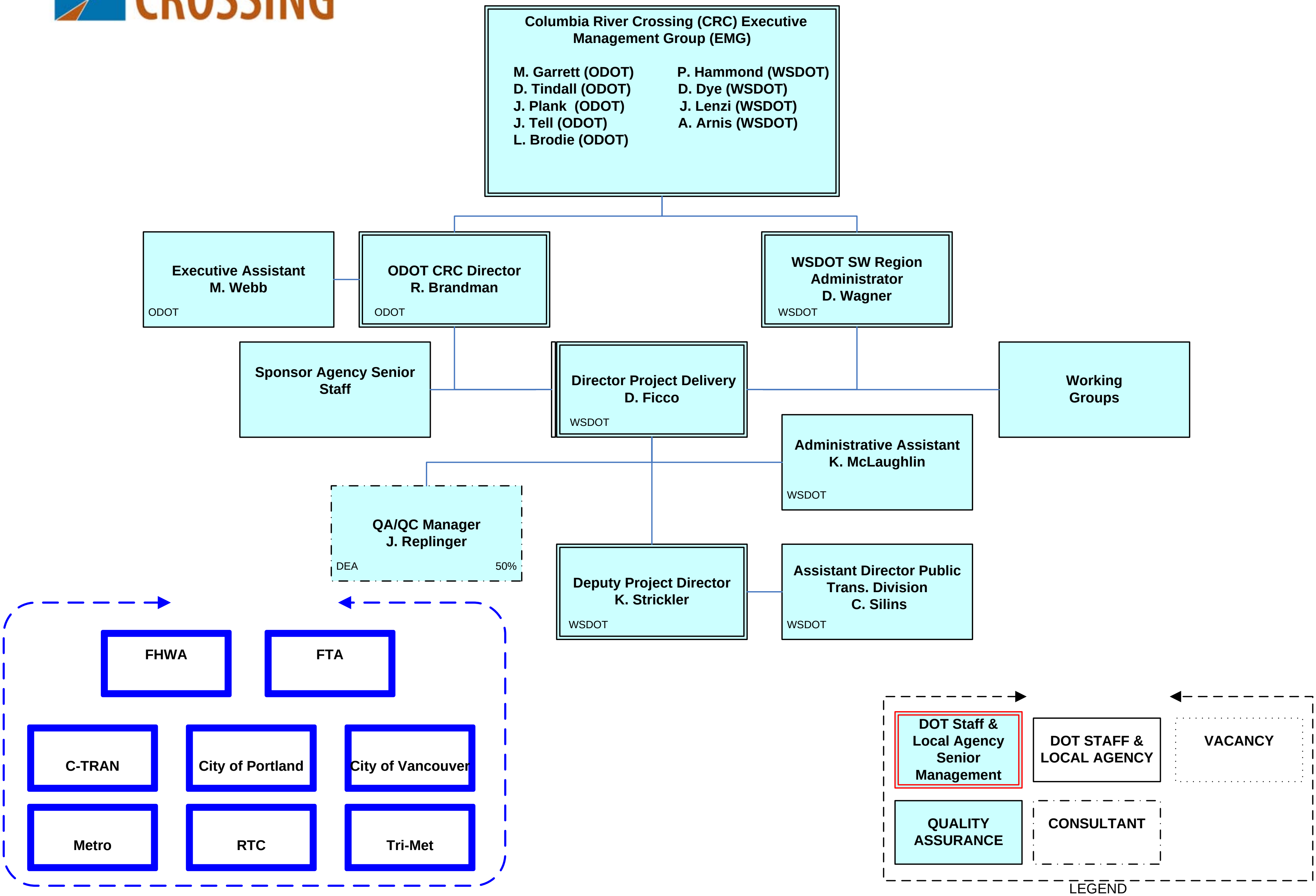
2.1.2 Columbia River Crossing Management and Project Development Teams

The CRC Project is co-managed by ODOT and WSDOT staff, with WSDOT and ODOT co-directors leading the effort. WSDOT will be grantee for the transit portion of the CRC project. FTA and FHWA are co-lead federal oversight agencies. In addition, TriMet, C-TRAN, City of Portland, City of Vancouver, Metro, and RTC are partner agencies. The overall success of the transit portion of the Columbia River Crossing project will rely heavily on the WSDOT's design, contracting, and construction experience, along with TriMet's Light Rail design and implementation experience.

The current organization chart is as follows:

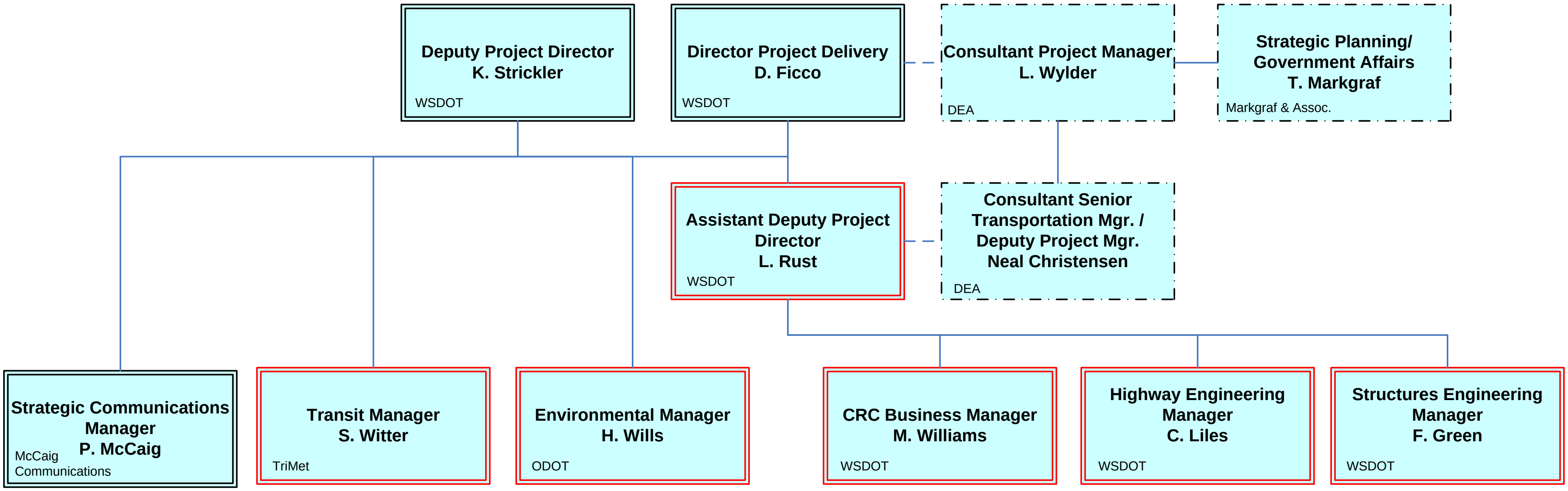
Figure 2-1. Project Development Team

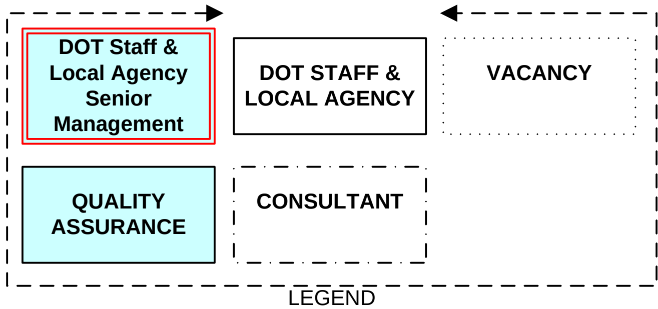
Columbia River Crossing Executive Management



Agency Participants

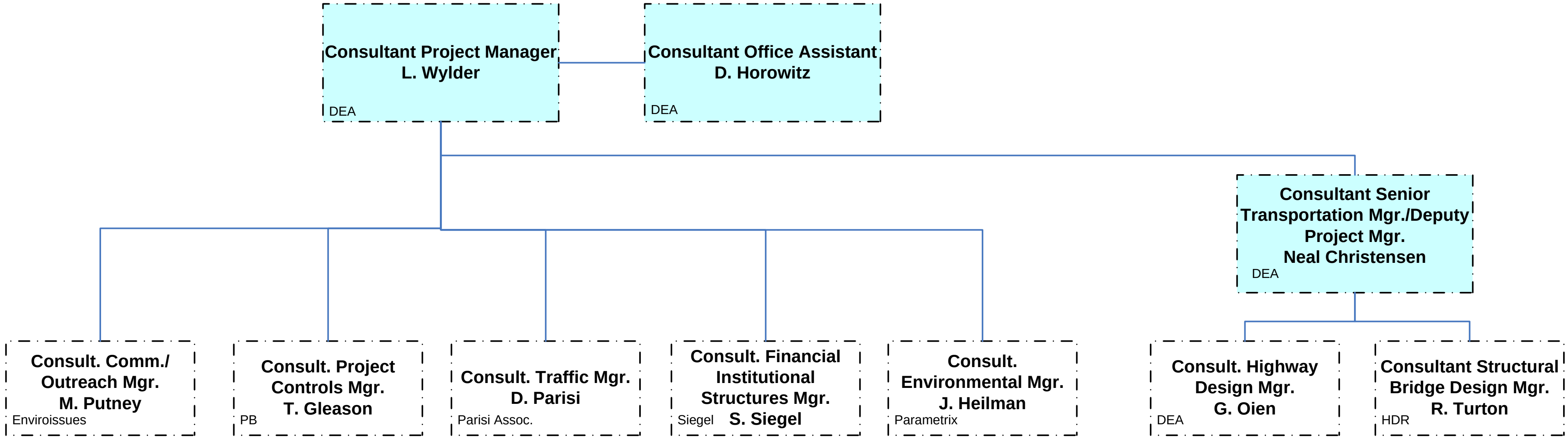
Columbia River Crossing Management Group

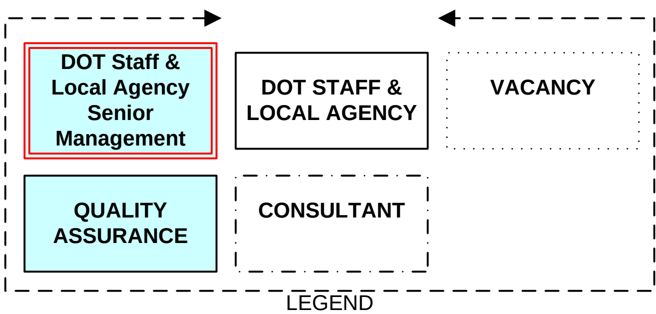




Columbia River CROSSING

Columbia River Crossing – Consultant Management Group





Columbia River CROSSING

Columbia River Crossing Communications Group

- **Strategic Communications Manager P. McCaig** — McCaig Communications
  - **Community Relations K. Belokonny** — C-TRAN 50%
  - **Community Relations Novotny** — TriMet 75%
    - **Community Relations Egnew** — TriMet 50%
  - **Planning/Outreach Assistant C. Francis** — WSDOT
  - **Lead Graphic Designer K. Martinek** — Parametrix
  - **Communications Consultant Writer Vacant** — WSDOT

- **Consultant Communications Outreach Manager M. Putney** — Enviroissues
  - **Communications Public Outreach D. Sandstrom** — Enviroissues
  - **Communications Public Outreach R. Orth** — Enviroissues
  - **Communications Public Outreach A. Pressentin** — Enviroissues
  - **Communications Public Outreach M. Hines** — Enviroissues
  - **Communications Public Outreach A. Bomar** — Enviroissues

DOT Staff & Local Agency Senior Management

DOT STAFF & LOCAL AGENCY

VACANCY

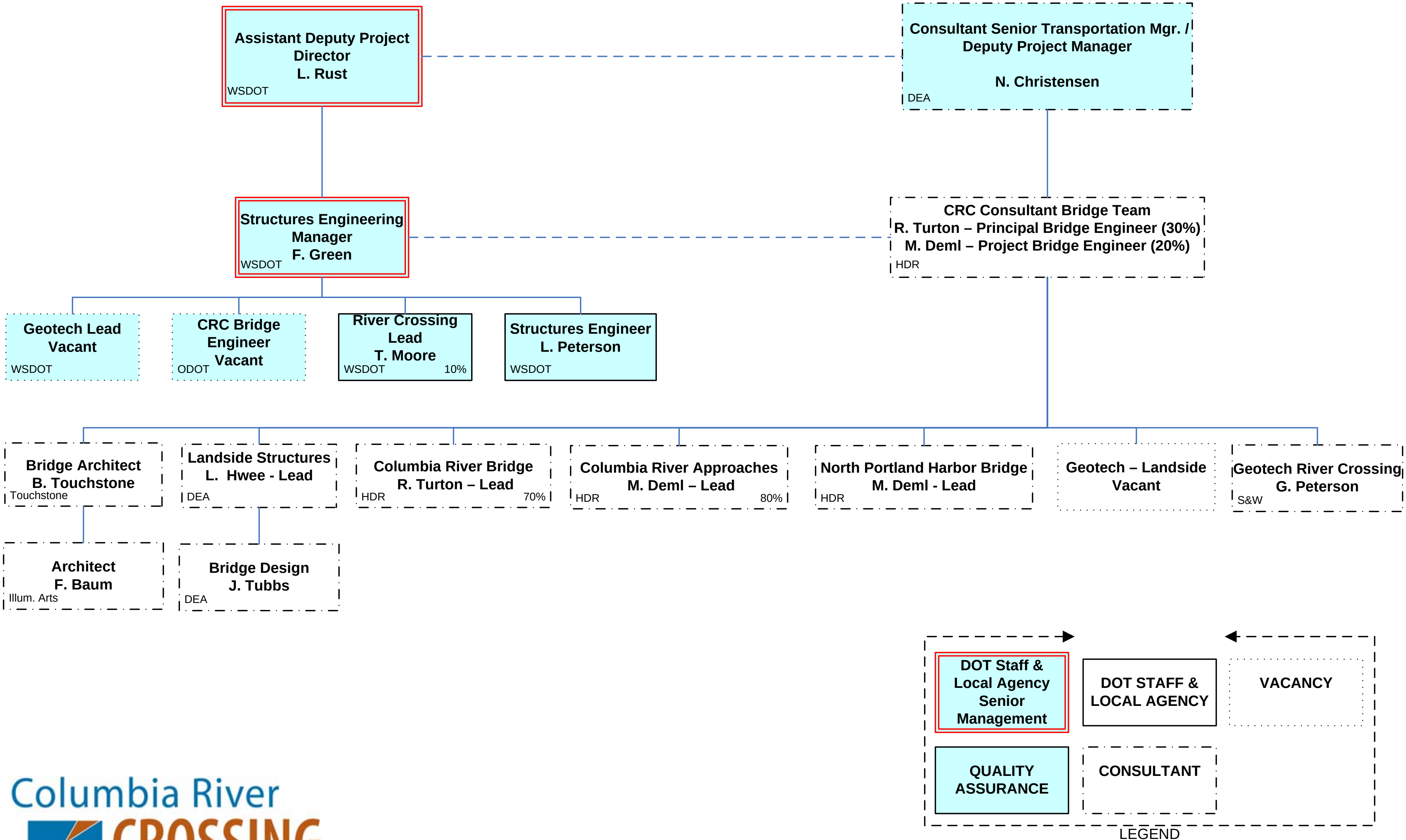
QUALITY ASSURANCE

CONSULTANT

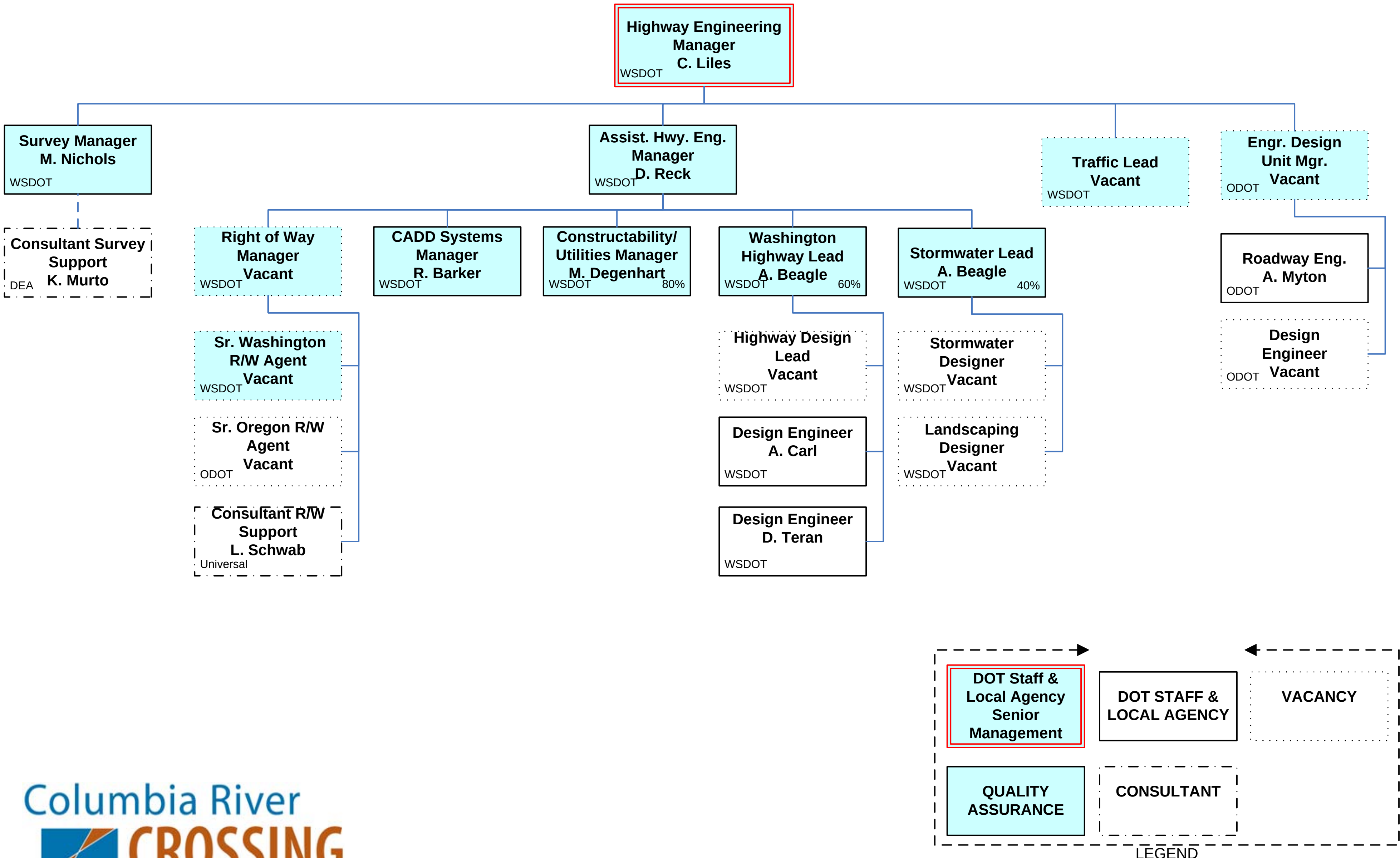
LEGEND

Columbia River CROSSING

Columbia River Crossing Structures Engineering Group

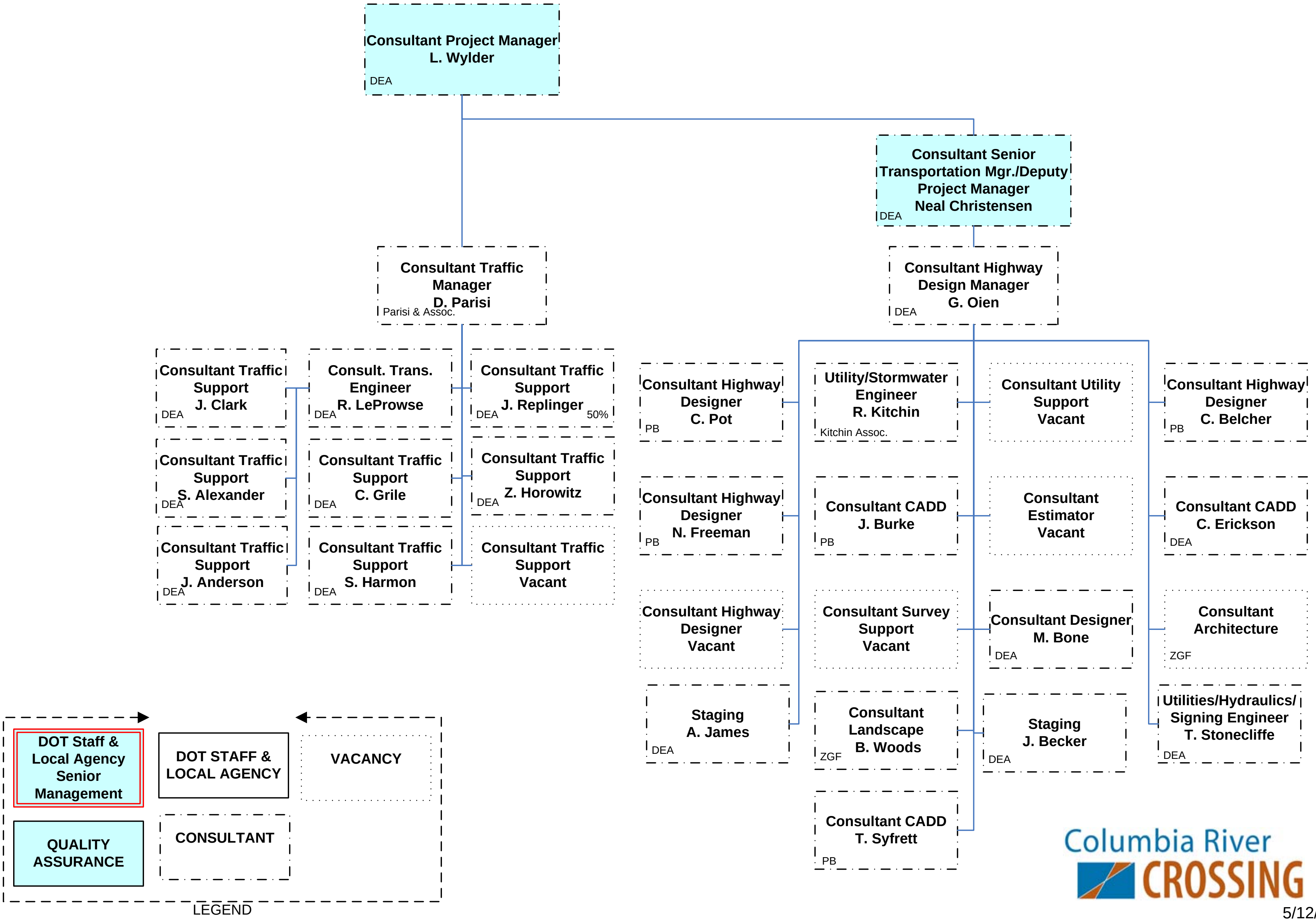


Columbia River Crossing Highway Engineering Group

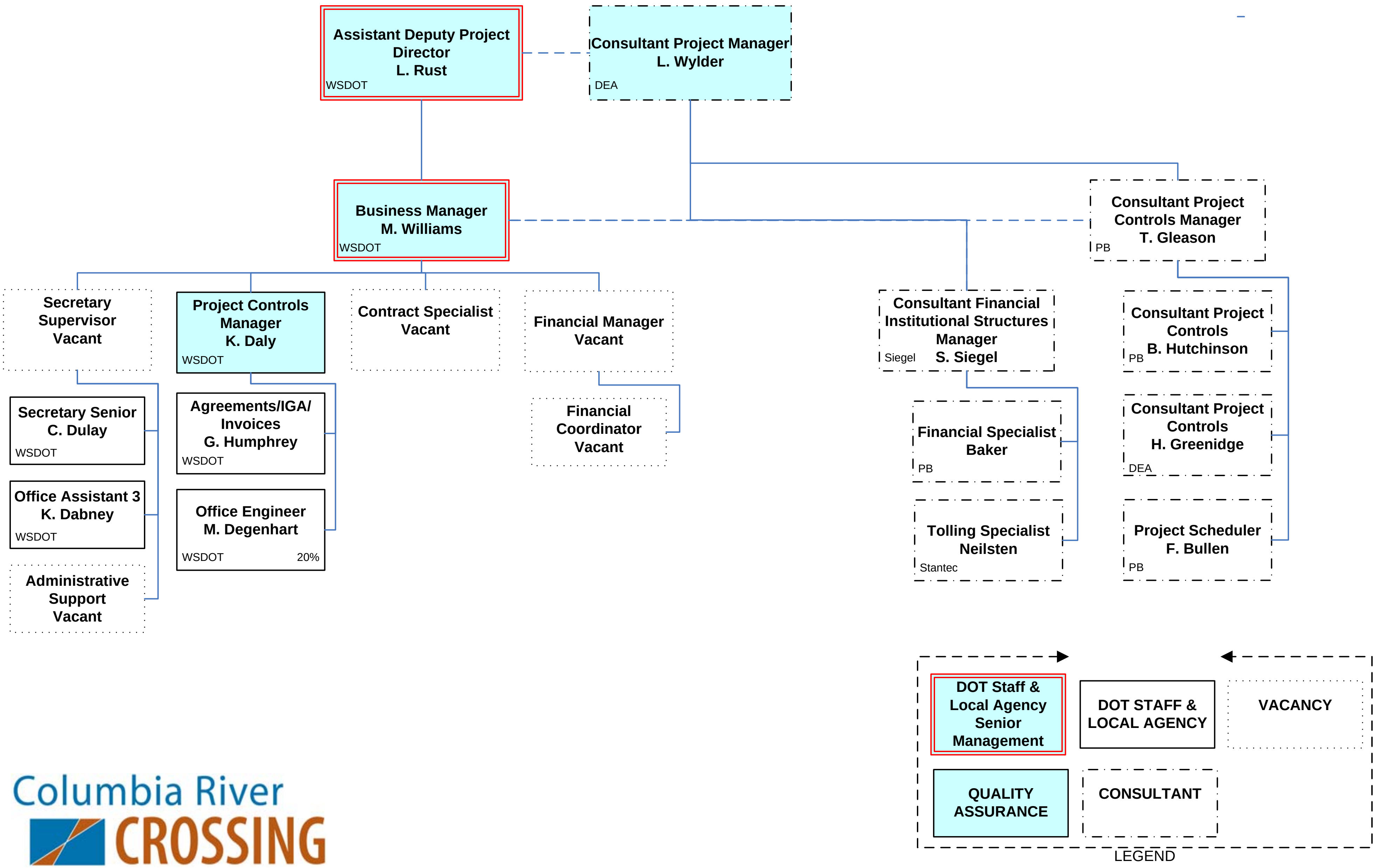


Columbia River CROSSING

Columbia River Crossing Consultant Highway Engineering Group



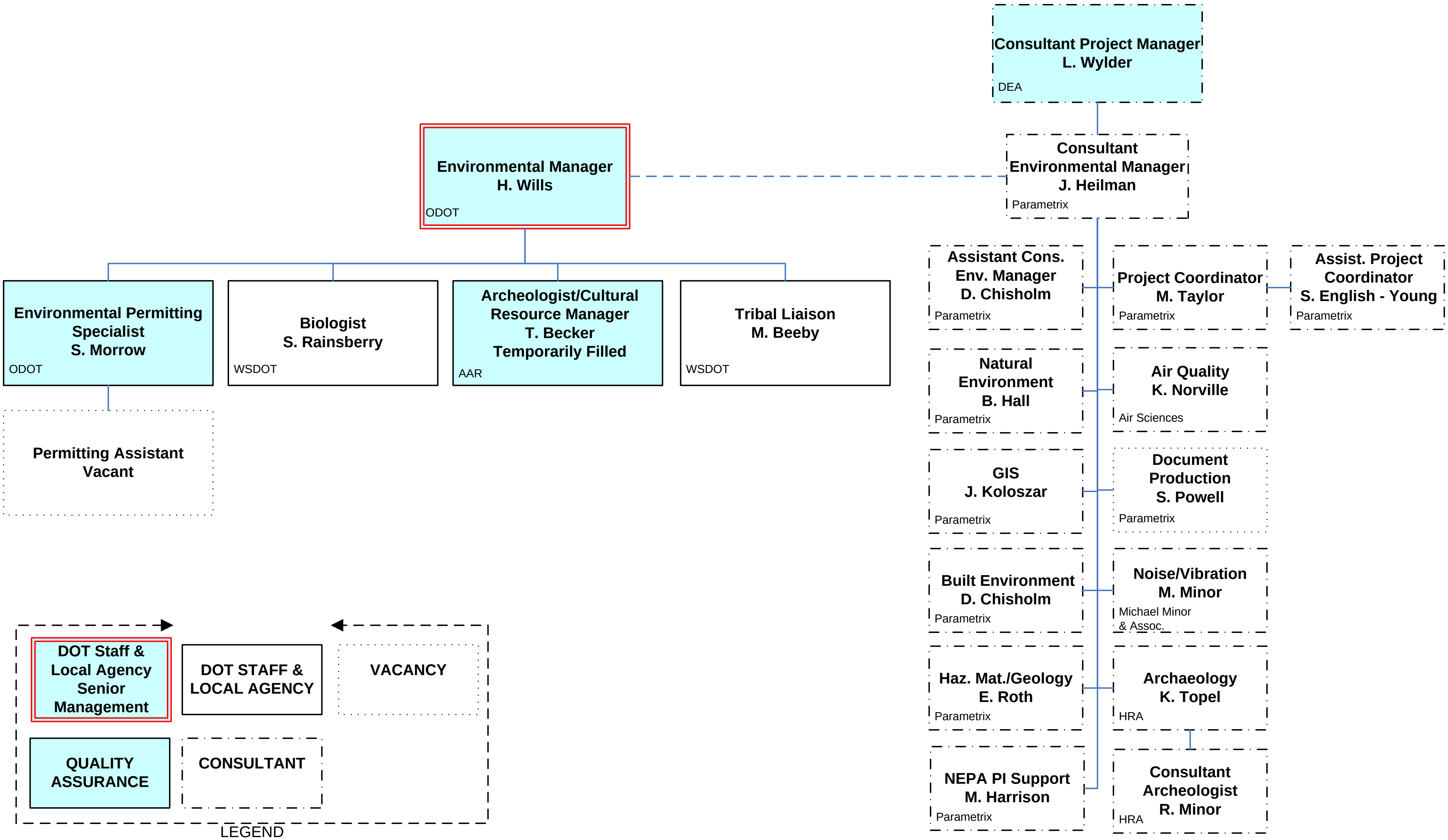
Columbia River Crossing Project Controls/Business Management Group



Columbia River CROSSING

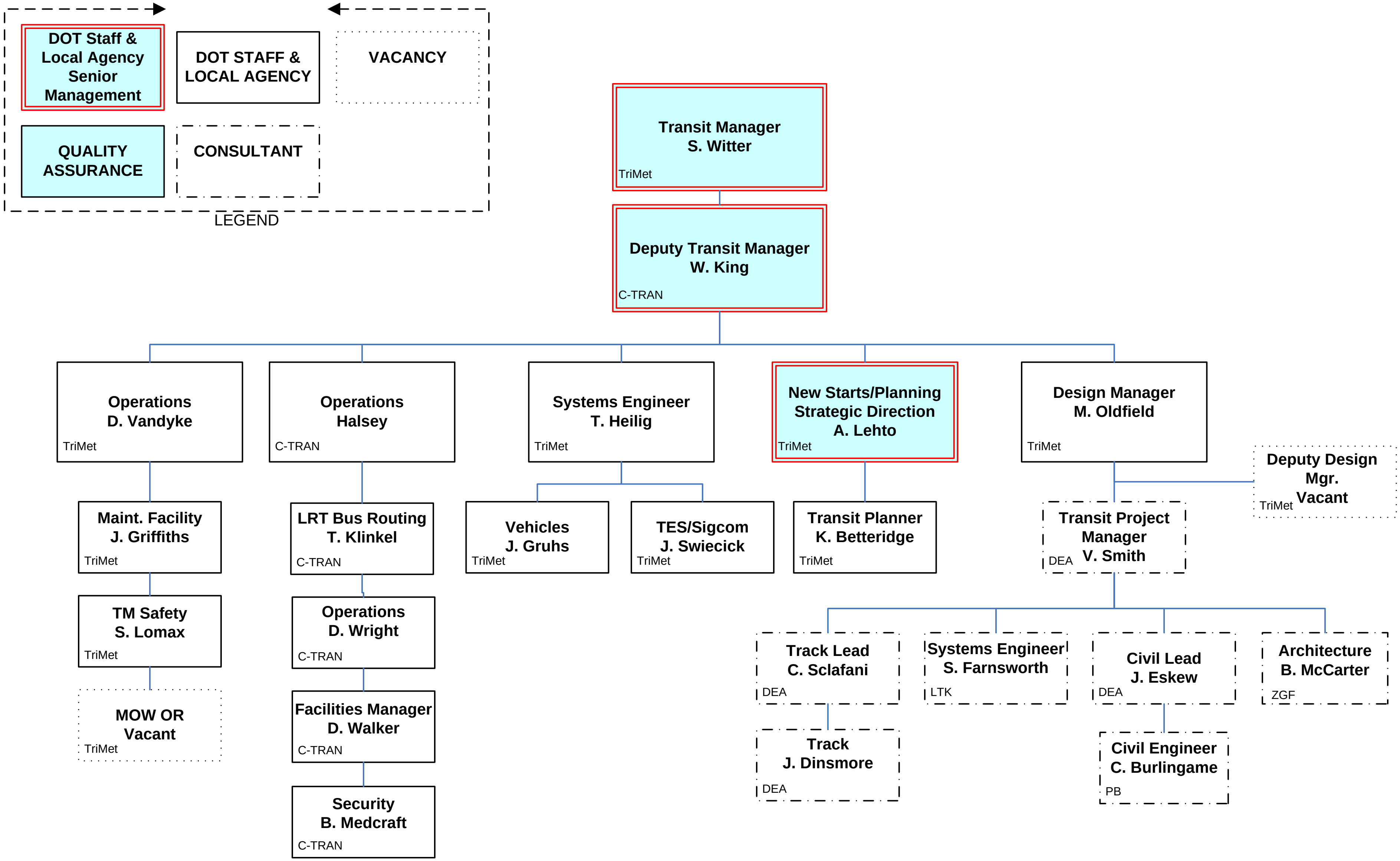
Columbia River CROSSING

Columbia River Crossing Environmental Group



Columbia River CROSSING

Columbia River Crossing Transit Engineering Group



2.1.3 Key Personnel – Project Development Team

The executive management team is comprised of senior/executive level staff from WSDOT and ODOT, with staff from TriMet and C-TRAN embedded in the management structure. The project is supported by staff and consultants with expertise in developing large, complex public projects. This team provides project oversight and is ultimately responsible for project development and delivery.

- Senior Agency Sponsor Staff:
  - Includes the following members:
    - Doug Ficco (WSDOT, CRC)
    - Richard Brandman (ODOT, CRC)
    - Neil McFarlane (TriMet)
    - Jeff Hamm (C-TRAN)
    - Thayer Rorabaugh (COV)
    - Paul Smith (COP)
    - Don Wagner (WSDOT)
    - Dean Lookingbill (RTC)
    - Ross Roberts (Metro)
  - Dispute Resolution
  - Coordination and communication of all policy and technical issues.
- Project Directors:
  - Developing a project which attains the goals and objectives.
  - Coordination and communication of all policy and technical issues with partner organizations.
- Deputy Project Director:
  - With the Project Manager, in charge of the day-to-day coordination and management of the Consultant team and other members of the project team.
  - Overseeing the administrative support for assigning and scheduling work, monitoring progress, and managing change.
  - Oversees and directs consultant project manager.
  - Ensuring candid, positive, open communication among bridge, highway, and transit implementing managers.

- Assistant Deputy Project Director:
  - Overseeing program management.
  - Overseeing highway and structural engineering.
  - Oversight for QA Program.
- Project Manager:
  - With the Deputy Project Director, in charge of the day-to-day coordination and management of the Consultant team.
  - Overseeing the administrative support for assigning and scheduling work, monitoring progress, and managing change.
  - Directing regular management meetings and cross departmental/inter-jurisdictional coordination.
- Communications Manager:
  - Coordinating communication outreach efforts for the project.
- Project Controls Manager:
  - Estimating and cost control measures.
  - Schedule management and reporting.
  - Documentation and reporting systems management.
  - Informing the Design Engineering Manager, the Deputy Project Director, and Project Directors of progress, schedule status, and issues.
  - Ensuring compliance with WSDOT and ODOT policies and procedures, state and federal laws and regulations, and agreement terms and conditions.
- Environmental Manager:
  - Overseeing the environmental task line, including development of the DEIS and the FEIS.
  - Overseeing environmental permitting.
- Transportation Planning/Transit Engineering Manager:
  - Managing the transit planning and engineering staff that support and complete the Alternative Analysis, DEIS, FEIS, and the FTA New Starts/PE application.
  - Serving as liaison with the two transit agencies.
- Engineering Design Managers – Structural and Highway:
  - Ensuring conceptual design meets the design standards and policies for WSDOT, ODOT, FHWA, and FTA.
  - Coordinating and presenting design concepts and cost estimates to project stakeholders and the public.

- Managing the Consultant Design team's development of conceptual designs and cost estimates and coordination with the project stakeholders.
- Coordinating and conducting the Value Engineering (VE) and CEVP workshop.

2.1.4 Dispute Resolution

CRC currently resolves disputes compartmentally, and elevating disputes if they cannot be resolved at the immediate level. Each major project component will attempt to resolve disputes internally through either the Highway, Bridge, Transit, or Environmental Managers. Should those managers be unable to resolve the conflict, the Project Directors provide the next resource for resolution. The Project Directors will bring disputes to Sponsor Agency Senior Staff (SASS) for a final resolution, should it be necessary.

2.1.5 Partner Interface Points

2.1.5.1 State and Local

The foundation of the CRC is a partnership drawing from numerous groups throughout the Portland-Vancouver region. Organizations participating include:

- WSDOT
- ODOT
- RTC
- Metro
- C-TRAN
- TriMet
- City of Vancouver
- City of Portland
- Port of Vancouver
- Port of Portland

The CRC project has received input from the 39-member Task Force as mentioned earlier. This group sunset after the LPA was endorsed. A new group, the PSC, has recently been formed at the direction of the Oregon and Washington Governors. It consists of one member each from ODOT, WSDOT, City of Vancouver, City of Portland, C-TRAN, TriMet, Metro, RTC, and a citizen member from each state. The Council will be charged with advising the CRC project team on:

- Completion of the Environmental Impact Statement (EIS).

- Project design, including but not limited to: examining ways to provide an efficient solution that meets safety, transportation, and environmental goals.
- Timelines associated with project development.
- Development and use of sustainable construction methods.
- Ensuring the project is consistent with Oregon's and Washington's statutory reduction goals for greenhouse gas emissions.
- A finance plan that balances revenue generation and demand management.

Also, the project has established several working groups to address specific issues and to provide a forum for open exchange of ideas from a broad prospective. Each working group exists to provide recommendations for design with an emphasis on context sensitive solutions for their particular area of interest. Groups include specialists from agency and consultant staff as well as other organizations. Consultant specialists facilitate the groups, while agency staff provides oversight and communication. Information and recommendations to and from each group are communicated to other affected areas of the project by the consultant and agency staff assigned to each group. Most working groups meet regularly on a monthly, bi-weekly, or as needed basis until their objective is reached. Current working groups are listed below. Other working groups may be formed or discontinued as needed. Additional information regarding these groups is listed in Section 2.7.6 of this plan.

- Community and Environmental Justice Group (CEJG)
- Freight Working Group (FWG)
- Pedestrian and Bicycle Advisory Committee (PBAC)
- Urban Design Advisory Group (UDAG)
- Vancouver Working Group (VWG)
- Portland Working Group (PWG)
- Marine Drive Stakeholders Group (MDSG)

2.1.5.2 Federal

FTA/Project Management Oversight Contractor (PMOC)

FTA utilizes transit industry consultants to assist in monitoring grantee compliance with all applicable federal requirements. The PMOC reports directly to the FTA on project progress and issues and serves as an extension of FTA staff. Typically, the PMOC conducts monthly on-site reviews, with other subject-specific reviews (Spot Reports) taking place as needed. The PMOC is expected to focus its assessment on scope, schedule, cost, and grantee technical capacity and capability, with an emphasis on risk identification and mitigation. The PMOC consultant also participates in quarterly review meetings held with FTA. The PMOC will conduct work in accordance with the FTA's Project Management Oversight Operating Guidances (PGs).

FTA Quarterly Reviews

Each quarter, the FTA and the PMOC will conduct a project review. Appropriate senior members of the Project Development Team, are responsible for organizing the meetings and arranging the agenda with FTA and PMOC. At the meetings, project staff will present a review of the progress of the preceding quarter and the activities planned for the upcoming quarter. Discussions from the quarterly review are recorded in minutes of the meeting prepared by PMOC and distributed to all parties.

Consistent with FTA requirements, CRC will submit quarterly electronic reports on project activities, budget, and schedule in the Transportation Electronic Award Management (TEAM) system.

FHWA Mega-Project

FHWA and the Oregon and Washington Departments of Transportation have a longstanding relationship of planning, developing, and maintaining roadway facilities together. As a result, FHWA maintains an oversight role but has delegated stewardship for the development and maintenance of federal facilities to the respective DOTs. Typically, a regional FHWA Area Engineer provides oversight and approval for projects either scoped on a federal facility and/or projects with an allocation of federal funding. Due to the size of the project, FHWA has assigned a Major Projects Manager to the CRC who is co-located in the CRC office and coordinates daily, including attending regular staff meetings. Additional detail regarding roles and responsibilities between FHWA and state DOTs is found in the FHWA Stewardship and Oversight Agreement (Feb. 19, 2008).

FHWA Reviews

As the project advances, a formal schedule of reviews will be established. As each state interacts with FHWA in slightly differing ways, the CRC project strives to consolidate that interaction with a dedicated FHWA Major Projects Manager. FHWA will review and provide comment on all environmental documentation, MOA/Us, Agreements, and design criteria for the project. A structured three-tiered design review is established, and FHWA approval at each tier is necessary before proceeding. This process is outlined as follows:

- Design Approval/Design Acceptance: (~30% design) for scope, schedule, budget, geometric design, known deviations/exceptions, and intersection and interchange plans.
- Project Development Approval: (~60% design) for scope, schedule, budget design documentation, advanced roadway design, and review of current design decisions.
- Final Plan, Specification, and Estimate (PS&E) Approval: for concurrence on final plans, provisions, and estimate.

Additionally, FHWA has placed requirements on project management methods and industry practices including, but not limited to:

- Project Management Plan
    - Required by SAFETEA-LU
    - Guidance is found at http://www.fhwa.dot.gov/programadmin/mega/
- Financial Management Plan
    - Required by SAFETEA-LU
    - Guidance is found at http://www.fhwa.dot.gov/programadmin/mega/
- Value Engineering Studies (see Section 2.4.4)

2.1.5.3 Other

The project will interface with numerous other public agencies including local, regional, state, and federal, as required by law and administration procedures.

2.2 Management Control

2.2.1 Overview

The CRC will continue using the established tight management controls already implemented. The diverse and vast transportation experiences of the DOTs and Transit agencies will be utilized for a successful outcome. As the project progresses and needs change, the project will finalize plans, roles, and responsibilities for weaving together the WSDOT, ODOT, TriMet, and C-TRAN control procedures during design, construction, and startup phases.

The Project Director(s), shown on Figure 2.1, in collaboration with various partners, provides overarching management control. Complementing this effort is a decentralized matrix of staff and consultant efforts located in the field and local agencies. The management controls are intended to provide central point of project coordination. They are summarized below.

- Risk Management and Insurance
- Project Control
    - Work Breakdown Structure (WBS)
    - Budget and cost control
    - Cost Tracking System
    - Financial Audits
    - Scope
    - Change Control
    - Schedule
    - Document control

- Investor Relations
  - Federal
  - State
  - Local

2.2.2 Risk Management and Insurance

Risk Management is the sum of conscious actions taken by CRC project staff, Agency employees and/or legal counsel to avoid or mitigate losses, which might impair the operational capability or financial status of the CRC project.

All CRC project staff shall be responsible for utilizing safe work practices, employing WSDOT adopted standards and procedures regarding public safety, and for providing a cooperative working environment for all fellow employees and staff. Prompt reporting of unsafe conditions, discriminating or harassing behavior, and/or accidents is required to their immediate supervisor and/or the applicable safety office or Office of Equal Opportunity (OEO) representative.

2.2.2.1 Risk Management Rules

For WSDOT who is the current agency at risk for the project, the Risk Management Office (RMO) has responsibility for directing and coordinating all risk functions, it shall be directly responsible for:

- Tort Claims Adjusting
- Property Damage Recoveries
- Risk Analysis
- Tort Self-Insurance Management
- Attorney General Tort Defense Cost Management
- Tort Claim Reporting

The RMO will coordinate information and act in an advisory capacity with regard to litigating torts, purchasing insurance, obtaining certificates of insurance for requesters, reporting tort claim information, and analyzing risk aspects of contracts, leases, agreements, or other legal documents.

Within the CRC Project, the Regional Administrator or Project Director shall be responsible for conducting operations in accordance with departmental standards and statutory requirements. They will determine the degree of indemnification and/or insurance protection necessary in consultation with the Office of Attorney General/WSDOT Division or the WSDOT Risk Manager, and will report losses or claims in accordance with requirements in Chapters 5 and 8 of the WSDOT Risk Management Manual.

When appropriate, these functions will be coordinated through C-TRAN and/or TriMet's Program Management. CRC management will coordinate with the C-TRAN and/or TriMet

Insurance Administrator who is responsible for identifying those areas of exposure that place project agencies at risk and for taking the necessary actions to protect against that risk in a fiscally responsible manner. For TriMet, the Insurance Administrator reports to the Director of Program Management and TriMet's Executive Director of Finance and Administration, ensuring the seamless integration of the program.

2.2.2.2 CRC Insurance

Washington State policy, as expressed in Chapter 43.19, RCW, is to assume risks to the maximum extent possible, but to purchase commercial insurance when, among other reasons: the size and nature of potential loss make it in the State's best interest; coverage is cost effective; or it's required by a fiduciary arrangement. WSDOT's risk exposures are financed by various combinations of self-assumption, self-insurance, and commercial insurance.

CRC Executive Management, along with WSDOT Headquarters, will determine the form of the Project's insurance program during the preliminary engineering phase.

2.2.2.3 Risk Control (Safety)

Information under the following heading will be developed during PE and Final Design for inclusion in later versions of this plan.

Office Safety

<u>CRC Building Evacuation Plan</u>

1. All CRC staff and visitors must evacuate the building immediately when a fire alarm is activated, using the north and south stairwells. Do not use the elevators. (See Figure 2-2 and Figure 2-3 below for a diagram of the evacuation plan.)

   1.1. The egress map in the elevator lobby shows the direction to the two stairwells from the lobby.

   - Stairwell #6 is the north stairwell, just north of the bathrooms.
   - Stairwell #7 is the south stairwell, just south of the lunchroom.

   1.2. The two doors to the elevator lobby will automatically be unlocked in case of emergency.

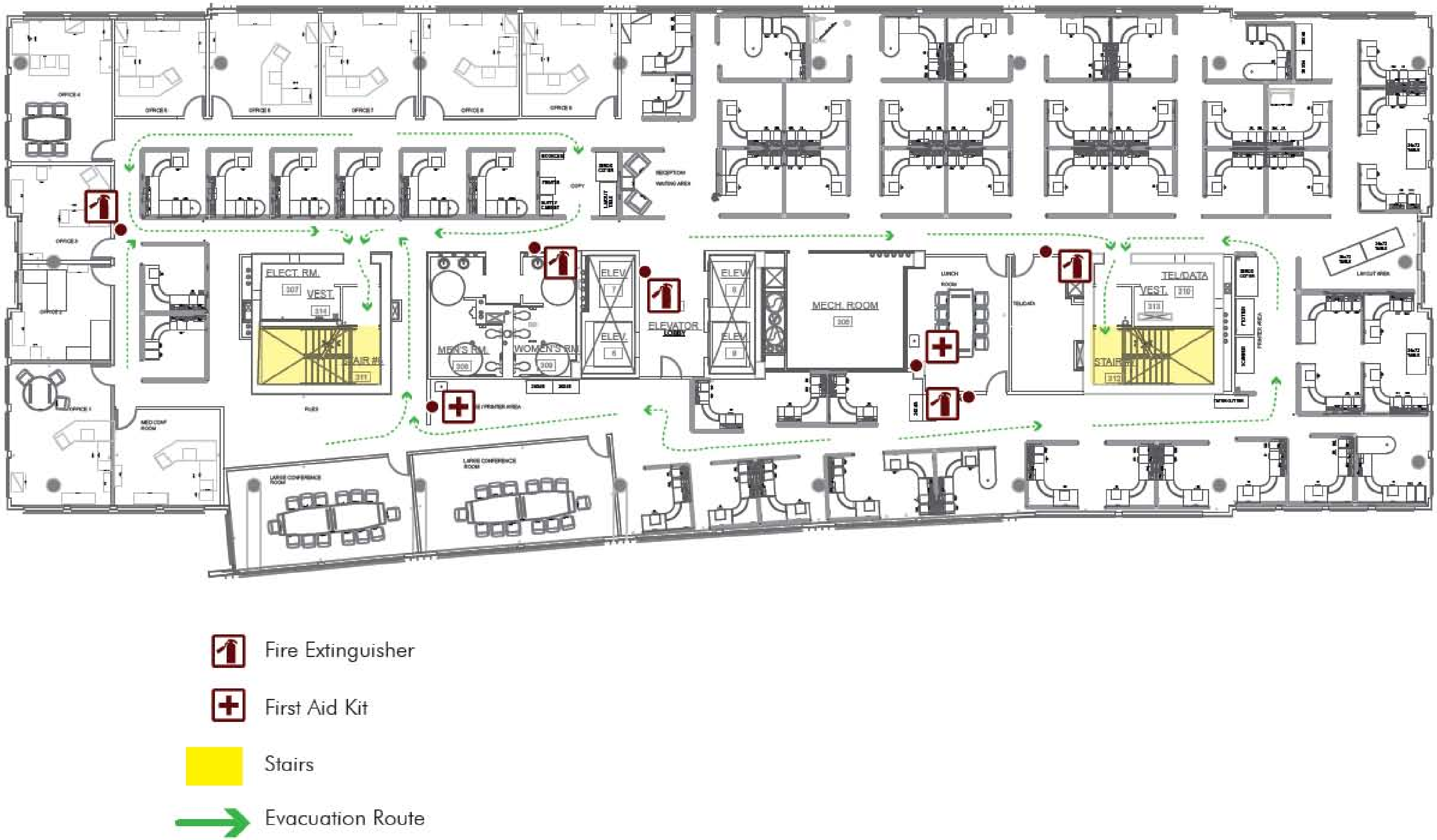
   1.3. For those with a disability, please wait at the landing area of the two stairwells for assistance to go down the stairs.

   1.4. Two designated sweepers will walk around the office to ensure that all CRC staff has evacuated the office. The sweepers shall take the visitors log and CRC emergency contact list with them to the designated meeting area (see #3 below).

   1.5. All visitors must sign in and sign out on the visitors' log at the front desk. CRC staff shall be responsible for escorting their visitors out of the building.

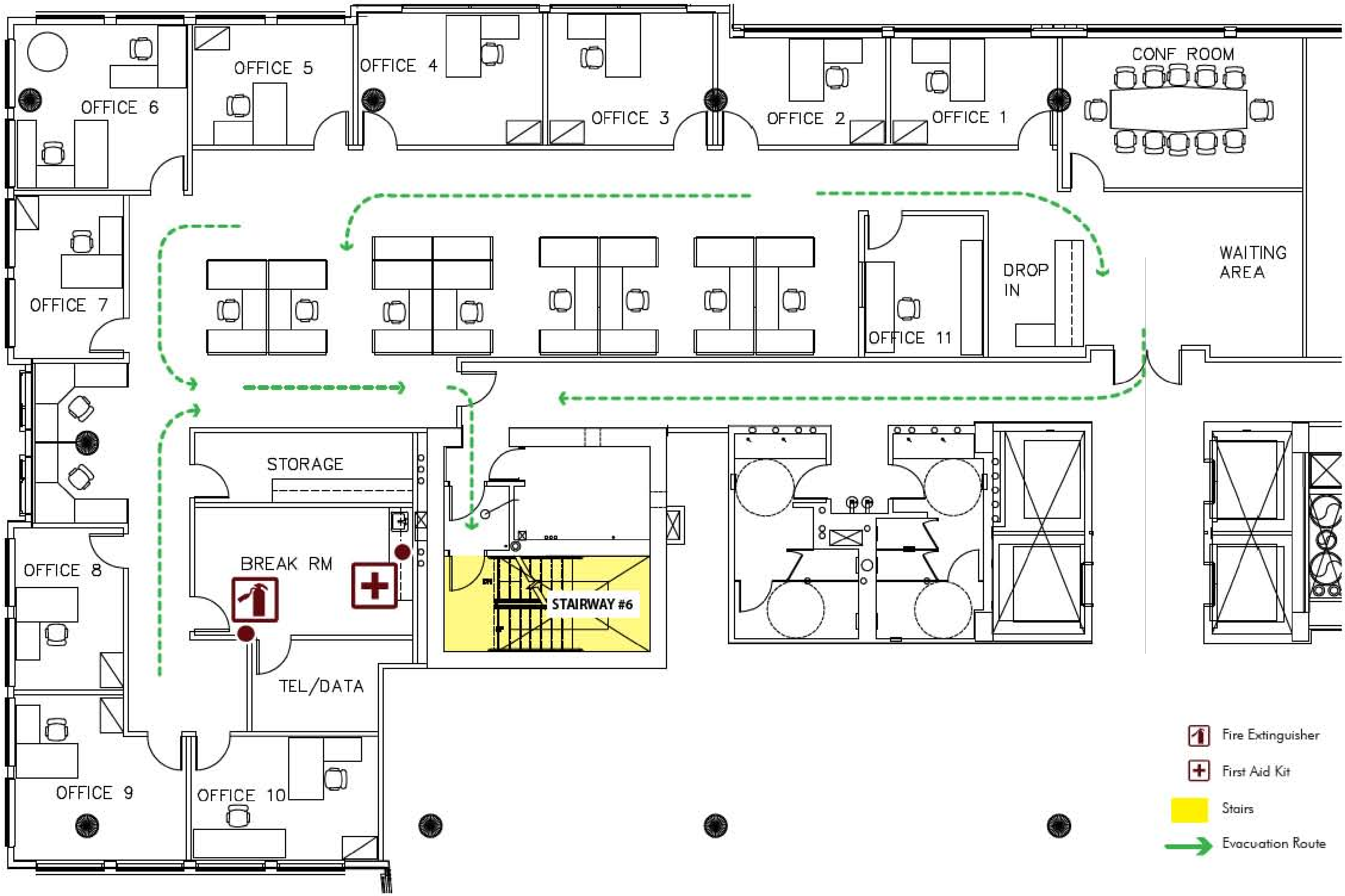
2. Proceed to the first floor (street level) and exit the building.

Figure 2-2. Third Floor Evacuation Plan



This page left blank intentionally.

Figure 2-3. Second Floor Evacuation Plan



This page left blank intentionally.

3. All CRC staff and visitors are to meet at the designated meeting area, which is the gazebo in Esther Short Park, located just south of 8th Street and just west of W. Columbia Street (across the street from Starbucks – 1 block west of Vancouver Center). The designated sweepers will meet with all evacuees and conduct a head count in this waiting area. Do not leave this waiting area until you have been authorized to do so by the designated sweepers.

   3.1. The designated 3rd floor sweepers, Lynn Rust and Devin Reck, will meet with key contacts of WSDOT and ODOT to conduct head counts.

      3.1.1. The designated 2nd floor sweepers, Mike Williams and Frank Green, will meet with key contacts of WSDOT and ODOT to conduct head counts.

   3.2. The key contact for WSDOT is Lynn Rust (the alternate is Ray Barker). The key contact for the consultants is Dann Horowitz (the alternate is Ron Anderson).

   3.3. The key contacts shall develop an emergency contact list for all the staff in the respective agencies/companies with contact information – office, home, and mobile phone numbers.

Information under the following heading will be developed for later versions of this plan.

Operational Safety

Construction Safety

2.2.2.4 Insurance Claims Management

The Insurance Administrator will manage and oversee all claims occurring. As necessary, the Insurance Administrator will coordinate with the contractor, insurance broker, carriers, and Agency legal staff and/or outside legal firms to ensure that claims are investigated and adjusted in an efficient and effective manner.

2.2.2.5 Loss Control

The Insurance Administrator will design and implement a tracking program of loss experience and assist in the implementation of a loss control program to reduce the ultimate costs and liabilities.

2.2.2.6 Insurance

WSDOT is self-insured and TriMet has in the past operated an Owner-Controlled Insurance Program (OCIP). As needed, through a Request for Proposal process, Agencies will select a qualified broker to assist in developing and marketing an insurance program, choosing insurance providers and placing coverage. Each construction contractor or supplier will also be responsible for its insurance outside the project site. The scope of work for each contract will be reviewed by the Insurance Administrator to determine any special coverage needs.

Information under the following headings will be developed for later versions of this plan.

2.2.2.7 Workers Compensation and Employers Liability Insurance

2.2.2.8 General Liability Including Excess Liability

2.2.2.9 Builders Risk Insurance

2.2.2.10 Railroad Protective Liability

2.2.2.11 Other Coverage

2.2.2.12 Consultants

2.2.2.13 Small Claims

2.2.2.14 Emergency Preparedness Planning

2.2.2.15 Hazardous Materials

2.2.2.16 Construction Surveys

ODOT requires a pre-construction record of survey (ROS) prior to bid-letting. The WSDOT requires either an ROS or stamp and signed monumentation map be produced prior to property acquisitions occurring. For project consistency, a full pre-construction ROS will be produced for the project. Both departments require a post-construction ROS once the project is complete. The following statues, policy, and regulations apply:

- Washington Administrative Code (WAC)
  - WAC 196 – Licensing
  - WAC 332-120 – Survey Monuments – removal or destruction
  - WAC 332-130 – Minimum Standards for land boundary surveys and geodetic control surveys and guidelines for the preparation of land descriptions
- Revised Code of Washington
  - RCW 58 – Boundaries and Plats
- Oregon Revised Statues
  - ORS 209 – County Surveyors
- Washington State Department of Transportation
  - Highway Surveying Manual M22-97
  - Plans Preparation Manual M22-31
- Oregon Department of Transportation
  - Pre-Construction Survey Standards and Procedures
  - ODOT R/W Monumentation Policy
  - Right of Way Monumentation Surveys
  - Control Recovery and Retracement Surveys

Other types of surveys will also occur for selected locations. Areas where vibration will be evident to neighbors will be especially targeted. It is not anticipated that any structural damage to existing facilities will be caused; however, surveys will assist in issue resolution should damage claims be filed. If any deep excavations adjacent to existing structures are required, ground movement monitoring instrumentation may be used during construction. The need for any such instrumentation will be determined through discussions with the project engineer and the structural engineer.

2.2.3 Project Control

2.2.3.1 Work Breakdown Structure

The CRC Project WBS has been developed to provide consistent treatment of similar project costs and schedule tasks. The WBS established for the CRC project is flexible in its ability to track all costs of the project and subprojects while accommodating different phases, agreements, tasks, subtasks, and entity attributes while providing powerful reporting capabilities. The CRC project WBS is deliverable-oriented and can be reported in any combination of the following seven levels. A complete listing of the current CRC WBS is in Appendix B, and a reporting example of its flexibility is in Appendix C.

The WBS is composed of seven hierarchical levels. These levels are defined as follows:

- Level I (Program) – the summary of all lower level WBS components.
- Level II (Individual Projects within the Program).
- Level III (Major Program Project Elements or Phase) – Breakdown of all major Program elements of the project (i.e., Environmental Impact Statement, Right-of-Way Acquisition, Construction, and/or subprojects).
- Level IV (Agreements) – Breakdown of all contracts by contract identification number.
- Level V (Tasks) – Currently the tasks of the project provide a breakdown of all tasks by their major area of work (i.e., Hwy. Engineering, Transit Engineering, Project Control, Communications, etc.).
- Level VI (Standard Costs Categories (SCC) or Subtasks) – Work activities of the contract subcomponents. During the current phase SCC codes are not applicable but as the project progresses, the SCCs will be included as mandated by FTA.
- Level VII (Consultant, Contractor, Owner) – Breakdown of all costs by who performed the work, irrespective of the agreement that the work was performed under.

All expenditures, budgets, and commitments will be entered based on all of the above described levels, where known. All contracts, including construction, will track all potential change orders (PCOs) or project risks or pressures to the project.

2.2.3.2 Maintenance of WBS

Changes to the WBS are made by project directors as needed to best reflect the direction and structure of the project as it evolves. Maintenance of this WBS with implementation of any approved changes will be performed by Project Control Staff.

2.2.3.3 Budget and Cost Control

The budget is established based on engineers' cost estimate and schedulers' forecast durations to account for the effects of inflation and potential interim finance cost. The Project Control Manager (PCM) is responsible for documenting the full scope of each phase of the project and matching it to a baseline budget that coordinates with the project WBS. The PCM will be responsible for tracking and reporting on the status of the budget and costs. The project directors, along with C-TRAN and TriMet when appropriate, will be responsible for initiating and justifying any changes to the budget and the PCM will be responsible for tracking all changes to the budget.

Cost Tracking System

The CRC project uses Prolog for its cost tracking software. Prolog operates on CRC's local area network and is a Sequel-based database application. The purpose of the cost tracking system is to provide timely information at a sufficient level of detail to accurately track:

<u>Budget</u>

All budget amounts will be tracked by WBS (SCC) coding in a manner that complies with all cost category requirements as defined by FTA and FHWA. The following levels of budget will be tracked:

Original Budget

The original budget will be the approved budget as specified by the Oregon and Washington State Legislatures and the Full Funding Grant Agreement.

Approved Budget Changes

Budget changes are those changes to the original budget or scope that have been approved by the project directors, C-TRAN and TriMet, as applicable.

Current Budget

The current budget equals the original budget that was established for the project combined with all approved budget amendments.

Proposed Budget Revisions

Proposed budget revisions are those amounts that have been proposed and have not yet been approved.

Proposed Budget

Proposed budget includes current budget plus or minus any proposed budget revisions.

Budget Variances

Budget variances are the differences between the Current or Approved budget and what is needed to complete the project.

Commitments

Commitments are equal to the total encumbrances up to the current period. While committed costs generally represent contracts, they can also be Purchase Orders, Work Orders, payments made to employees, and others. In order to be a committed amount, it must be an actual obligation to the Project for payment of the services or goods to be provided or the amount must have been paid as is the case with DOT payroll and miscellaneous expenditures. Commitments are entered into the system using the WBS (including SCC coding) and funding sources, where known. Contracts will include contract number, description of the contract, the contract manager where applicable, and all dates and changes to the contract.

Uncommitted Amounts

Uncommitted amounts are those amounts that have been set aside in the project budget but have not yet been task ordered or given specific notice to proceed on the work. An example includes the David Evans and Associates, Inc. (DEA) base contract where some portion of it does not reside in a task order and therefore there is no authorization to charge against that amount.

Actual Costs

Actual costs to the project are tracked by WBS (including SCC coding and Funding codes, where applicable). Actual costs include all progress payments to consultants and contractors. Actual costs will be tracked both by period and cumulative to date.

Estimate at Completion

The Estimate at Completion (EAC) is the forecast of the cost at the end of the project. If applicable, pending changes are added to the system each reporting period so that it always reflects current information and progress to date. At the end of the project, the EAC equals the actual cost. Program management staff are responsible for estimating the total expenditures through completion of the project. Estimate at Completion includes all contracts, change orders (COs), anticipated change orders, and planned contingency amounts.

Estimate to Completion

The Estimate to Complete (ETC) amount is the forecast of the cost remaining before the project is complete. It is defined as the difference between the EAC and the Total Committed Cost (TCC). The ETC value reflects the amount of Purchase Orders, contracts, etc. not yet placed.

Forecasted Project Risks

Forecasted risks include estimates of project pressures or potential budget and schedule impacts that have been identified on the project that are not included in the budget and their anticipated outcome is still uncertain.

Funding Sources

The tracking of funding sources includes the name of the funding partner and the percentage or dollar amount of participation in each specific agreement. In addition to tracking the sources, the PCM will also be responsible for tracking any known changes to the sources as well as how much has been drawn down on the source and when.

The cost tracking system provides the project with the ability to enter, view, access, and distribute information in a manner that is conducive to the uniform understanding of the scope by stakeholders at differing levels and interest on the project, while also providing the ability to provide accountability on outstanding and underperforming elements of work through the current reporting period. The current reporting period includes all information entered into the database up to the date that the reports have been run.

The PCM will be responsible for all data entry of funding-related information, ensuring that appropriate accounting and project control procedures are followed.

2.2.3.4 Cost Allocation Plan

In accordance with 2 Code of Federal Regulations (CFR) Part 225 and FTA Circular 5010.1D, CRC will prepare an indirect cost plan to distribute central service (finance and human resource), project management, and administration costs of grantee support. The plan facilitates the consistent and fair distribution of the CRC's share of common costs to the project's account(s). CRC is responsible for updates. Any plan changes in excess of 10 percent will also require FTA approval. Costs commonly included in cost allocation plan include:

- Indirect Materials and Services – Costs incurred by CRC that are determined to be allowable under the guidelines of 2 CFR Part 225, allocated per FTA Circular 5010.1D will be considered joint costs.

Direct charges to LRT are not included in the cost allocation plan, but are referenced here for completeness.

Direct Personnel – Personnel costs reflect the positions identified in the table of organization and position descriptions in the PMP, and direct time charges from transit agencies. Costs include base salary and fringe benefits. These costs are usually recorded via employee timesheets or other time record.

Direct Materials and Services – Costs that are determined to be allowable under the guidelines of 2 CFR Part 225 and that specifically benefit the LRT will be recorded as direct costs.

2.2.3.5 Financial Audits

In addition to state audits, audits related to project resources and expenditures would be incorporated into an annual independent audit of federal grant-related projects. Annual audit results are generally released within 150 days of the end of the fiscal year.

The project's transit-related activities will also be subject to FTA's Triennial Review.

2.2.3.6 Scope

Scope management for the CRC will encompass the following elements:

- A clear listing of measurable, comprehensive, and definitive tasks will be created for each phase of the project.
- The required tasks will be developed from the written project scope into an understandable format through the use of a WBS.
- Project deliverables that are products of the tasks will be identified as benchmarks in the schedule and monitored very closely for slippage.
- Modifications to the baseline scope should be identified as changes consistent with accepted change standards, followed by re-establishing the baseline for future reporting.

Any change which could affect or potentially change the project scope and WBS is managed through the change control process.

2.2.3.7 Change Control

The intent of the CRC Change Control process, a TriMet practice, is to ensure that the project scope, schedule, budget, and quality objectives committed to the legislature and other stakeholders are achieved. Where this is not feasible, project change controls provide a consistent and well documented means of managing change. Project Change Control activities encompass monitoring and measuring progress against the established baselines to anticipate and identify variances from the plan, the system of approvals required for the authorization of change, detection of incorrect or unauthorized changes, and any corrective action taken to prevent or mitigate variances from established baselines.

Identification and Documentation

Everyone on the CRC team is responsible for identifying activities and issues that may impact the project scope, schedule, or budget. Ultimately, project managers are responsible for delivering their tasks according to scope, schedule, and budget. However, adjustments to project schedules and budgets are sometimes required. In the event that impacts are identified, the following steps will be taken:

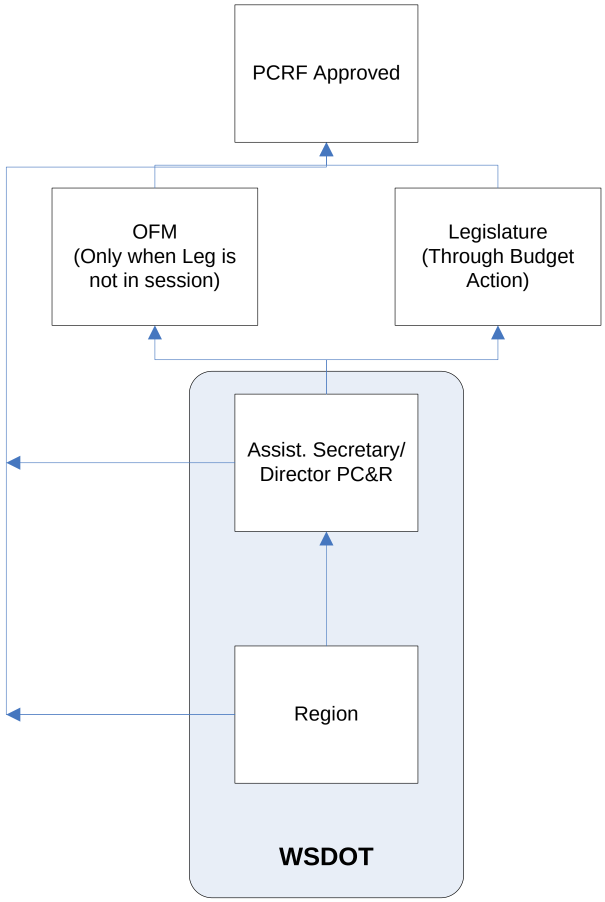
- <u>Log and Report Request(s) through Document Control</u>. The issue should be documented in an e-mail, transmitted to the Project Manager and Deputy Project Director, and copied to Document Control. Document Control will log the potential change into Prolog so that it can be tracked along with its associated risk to the overall project.

- Prepare Change Folder/Package. Information regarding the change should be developed by the Task Manager or designee incorporating all the known elements associated with the change, such as scope, cost, and/or schedule.
- Finding of Fact. A memorandum should be prepared by the Consultant Project Manager or designee as to the pertinent facts, chronology, and evaluation of any proposals related to the change.
- Determination of Merit. The Contract Administration Manager may request additional analysis of change proposals, which includes verification of the following:
    - The quantities and kinds of materials proposed.
    - The need for the number and kinds of labor hours and the labor mix.
    - The need for such other direct charges as travel, equipment, and furniture purchases, software, etc.
    - Any other technical data that may be pertinent to the modification.
    - A scheduling review of the fragment provided with the change proposal.
- Negotiation. If it is determined that the work is out of scope and a decision is made to proceed, the Project Manager and Deputy Project Director should negotiate the terms of the requested change. The Project Director is ultimately responsible for ensuring that prices paid are fair and reasonable. All negotiations and price/costs analysis will be in compliance with the WSDOT procurement procedures manual, except where TriMet or C-TRAN procurement procedures are applicable for transit elements.
- Formalize the Change. An amendment will be initiated to cover the extra services. If the consultant anticipates sufficient budget is available to do the extra work, the work effort will be documented and may be revisited if the effort exceeds expectations. The Contract Administrator is responsible for developing the final change documents. Once executed, signed original modifications are scanned and maintained by Document Control, with originals going to WSDOT and TriMet for transit-related elements.
- Execute Change. The agreed upon change should be formalized by written directive to proceed by the Deputy Project Director. Once formalized, the information will be entered into Prolog and the change will be closed out.

The Project Change Request Form (PCRF)

The PCRF is the primary mechanism through which WSDOT manages change to its design project’s scope, schedule, and budget. For construction projects, a change order does not increase authorized funding. A PCRF will be needed if the change order costs exceed the project’s budget, including contingencies. In order for a PCRF to be approved, the WSDOT Project Director must go through the Region and follow the approval process shown in the diagram below.

Figure 2-4. WSDOT Change Request Approval Process



Budget Transfer Procedures

The CRC project will be governed by several guidelines for administration of budget and contingency transfers between elements.

- The DOTs, in coordination with TriMet and C-TRAN, where appropriate, will approve all budget transfers between contingency and individual contract packages.
- Budget transfers between line items within individual contract packages or work elements may be requested by a contract or project manager or project engineer or resident engineer and made with the approval of the CRC Project Director.
- During final design, budgets for each contract package will be established. Subsequently, all budget changes between contract packages – or between contract packages and contingency – shall be supported by written documentation approved by Program Management.
- No direct contingency transfers between individual construction and procurement contracts are permitted. If an individual contract contingency budget is decreased, the amount shall be transferred to owner's contingency. Following proper documentation, subsequent transfer to another package may be made.

Contingency Planning and Management

A PE-level contingency management plan was submitted in the PE application along with the first version of the Project Management Plan.

2.2.3.8 Schedule

Schedule Control

Schedule management is a shared responsibility and will be accomplished through the use of several levels of schedules, a change control process, and a comprehensive monitoring and reporting system.

CRC's Project Scheduler has primary responsibility for schedule management and the development of the overall program schedule and reports to the Project Control Manager. The CRC Project Control DOT Manager has primary responsibility for the entire schedule, and thus, will carefully coordinate with any related TriMet and C-TRAN schedules.

Schedule management for all phases of the project, including construction, will maintain the following elements:

- A well-defined project scope or WBS which forms the backbone for schedule development and the key to effective schedule management/control.
- A planning process beginning with the development of the initial or baseline schedule.
- A process of obtaining and accepting revisions to the baseline schedule, including establishment of regular periodic updates.

Each successive schedule level represents a higher level of detail and each lower level will automatically "roll-up" and support (through ever-increasing levels of detail) to the next higher level.

Overall Master Project Schedule

The Master Schedule encompasses the entire CRC Project. This schedule is an evolving document and is revised, as necessary, to reflect the current scope and organization of the Project. The CRC master schedule includes all major milestones and interrelationships among activities within the prime contract, with coordination activities with other entities and or contracts identified. The Master Schedule is being maintained by the Project Scheduler as a part of the Project Control team. Once the baseline is complete, it will be adopted by the Project Team as the official plan for the project.

<u>Control Detail Schedules</u>

Lower level schedules are termed Detail Schedules. They outline the detailed activities that represent the work under each contract. These are the working schedules that facilitate planning, contract package determination, contractor monitoring, updating, and reporting. Detail schedules will be developed as final design progresses. Examples of these schedules are described below.

PE and Final Design Schedules

Design schedules may be developed, maintained, and updated by the Design Managers and Project Director for each Highway or LRT segment. These schedules would include major deliverables, interim milestones, and review periods that are part of the plan to accomplish the overall design tasks. These schedules will be discussed and updated at the staff meetings, and used to update the Master Program Schedule.

Construction, Equipment Procurement, and Installation Schedules

These schedules will be developed initially by the CRC Project Control team for each contract package, and expanded by contractors after award of the contracts. Every major construction or installation contract will contain detailed scheduling requirements in the contract specifications. The contractor's schedule is the working tool for monitoring contract progress in the field. The contractor's approved "as-planned" schedules will be reviewed weekly and updated monthly so that over the duration of the contract they establish the history of construction activity. CRC Project Management will review the monthly construction updates and discuss them with the Project Scheduler for input to the Master Schedule.

Utilities

Schedules will be developed for public and private utility work prior to its commencement.

Schedule information will be maintained and updated by Project Management staff.

Third Party Jurisdictions

Schedule information relating to the work of other public jurisdictions (i.e., C-TRAN, the City of Portland, and City of Vancouver) regarding construction activities and restrictions in and around the project area will also be developed. The Project Scheduler will prepare this schedule data from data furnished by the jurisdiction. This schedule information will be incorporated into the Master Program Schedule and integrated with the other schedule data to coordinate work activities.

Systems Integration and Start-up

The contractor's schedule is the starting point for monitoring contract progress in the field. The contractor's approved "as-planned" schedules will be reviewed weekly and updated monthly by the CRC project management so that over the duration of the contract they establish the history of construction activity. Coordination between all stakeholders will be an ongoing interface to examine the detail of systems integration and startup. When all parties are satisfied with regard to activities and durations, the group will work with the Project Scheduler for validation and input to the CRC Master Schedule.

Other Schedule Information

Other schedule data will be researched and developed by the Project Scheduler in conjunction with various contract managers. Expected schedule information includes:

- Columbia River Crossing highlighting key progress milestones and "deliverables."

- Advertise/bid/award dates for each contract package.
- Environmental clearances and approvals.
- Right-of-way (ROW) acquisition and relocation activities.
- Utility relocations.
- Schedule for land use, street encroachment, and other permits.

Schedule Coordination, Updates, and Revisions

The goal of the Schedule Updating process is to reflect the most accurate information available of the progress achieved by all levels and organizations involved in the Project, and to demonstrate the impact of this progress on the overall Master Schedule. Project Scheduler has the primary responsibility for coordinating the Project status information. The CRC Project Scheduler also will review schedule updates received from contractors and incorporate this information into the Project schedule updates.

The individual project managers will coordinate with the Project Control team based on their detail schedules and will be responsible for getting appropriate information to the Project Scheduler for inclusion into the master schedule. These schedules will be the primary tools for planning and coordinating the work of each project phase. Schedule coordination among all groups should occur no less than once per month.

Schedule Monitoring and Reporting

The CRC Project uses Primavera 6 (P6) software for schedule monitoring and analysis. Schedule monitoring provides a clear indication of performance. Part of the schedule monitoring process is to detect adverse trends in administrative, design, or construction activities early enough to initiate corrective action.

If a delay to the critical path of the project is identified, the Project Scheduler provides Project Management with the information necessary to determine corrective action.

Schedule Reports

Project status, schedule conflicts, changes, and delays are monitored and reported on a regular basis, and at least monthly. Regular schedule reports are prepared and distributed to the Project Team and other involved parties. The reports provide a consistent basis for evaluating progress and allow managers to focus on exceptional events or negative trends. Schedule status is included as part of the CRC monthly and quarterly reports. As the need arises, Project Controls will produce special studies and analyses of particular situations. The format and distribution of such reports are tailored to the specific needs of the situation.

The Project Scheduler will see to it that various schedules from implementing teams “dovetail” as needed within the CRC master schedule to ensure cost-effective work flow and minimize potential negative community impacts of construction.

If discrepancies exist between any update proposed for the Master Program Schedule and the current Approved Baseline Master Program Schedule, the CRC Project Scheduler will define the impact to the schedule. If the projected delay might be critical, then corrective steps must be identified through discussions with the CRC Project Management Staff and the Project Directors.

Baseline Schedule Revisions

Situations may arise in which a delay is determined to be irrecoverable. In such cases, the CRC Project may recommend that a revision be made to the approved Baseline Master Project Schedule.

As potential delays become apparent to Project Management, the first action will be to initiate a schedule review to determine if the lost time can be made up. In most cases, the Project Scheduler will enlist the aid of CRC Project Management to research the delay and recommend strategies to the Project Director to recover the time. No revisions affecting the critical path will be allowed without approval authorization from the Project Director.

Construction Contract Schedule Revisions

Together with the contractor, CRC will review the schedule when delays occur, particularly whenever the contract falls behind its approved schedule by a specified number of days (taking into account all time extensions granted to date). CRC may ask the contractor to prepare a recovery plan. This recovery plan may become the basis for a revision to the approved Baseline Master Program Schedule.

Time extensions affecting schedule completion dates may be granted to specific contracts for a variety of reasons, including:

- Changes in contract scope.
- Resolution of a dispute or claim.
- Weather delays (if more adverse than could have been anticipated).

Before any extension of time is considered, Project Management will confer with the Project Directors to conduct an analysis of the contemplated extension to determine the impact. Time extensions can have a "ripple" effect to follow-on contractors, systems installation, testing, and eventually to the revenue service date.

If a time extension is warranted without a significant effect on the Master Project Schedule, then a contract change order may be prepared granting the time extension. A revision to that particular element of the Master Project Schedule will be made. If, however, the time extension is significant and will impact the schedule milestone date or critical path, options other than an extension of time will be considered. Examples of such options would be extended work hours, re-sequencing of work, weekend work, or additional crews or other resources.

2.2.4 Reporting, Performance Measurement, and Cost Forecasting

The principal tool for measuring and reporting performance of the project is the monthly project reports, which include cost and schedule information. Project reports are prepared monthly and, if applicable, will reference the approved FFGA benchmarks, including subsequent FTA-approved changes, to provide a context for evaluating the reported information. In monthly project reports, CRC will employ both the WBS structure and FTA's Standard Cost Categories (SCCs).

The WSDOT reports on its activities and project delivery performance to the legislature, the Office of Financial Management (OFM), the Governor's Office, and other stakeholders through its system of quarterly reviews and reporting. In addition, the Project Control and Reporting Office (PCRO) and regional Program Management offices of WSDOT use the Capital Program Management System (CPMS) to monitor each program. PCRO works with the regions and the modes to compile, refine, and prepare for presentation, project summary, and program delivery reports. These reports are at levels of detail and aggregation useful to the Transportation Commission, the legislature, and the general public. They are produced each quarter and on an ad hoc basis.

At the project level, project status, schedule conflicts, changes, and delays will be monitored and reported on a regular basis. Schedule reports will be prepared and distributed to the project team and other involved parties regularly. The reports will provide a consistent basis for evaluating progress and will allow managers to focus on exceptional events or negative trends.

The CRC project currently has a standard set of cost reports and will develop others as required by the various funding agencies and by the Project Directors. These reports will be prepared monthly and where applicable will reference the approved FFGA benchmarks, including subsequent FTA-approved changes to provide a basis for evaluating the reported information.

Cost reports may include detailed line item reports as well as various levels of summary reports. The Project Control team will also undertake special analysis and produce oversight and monthly reports as required. As the need arises, the Project Control team will produce special studies and analyses of particular situations. The format and distribution of such reports will be tailored to the specific needs of the situation.

2.2.5 Document Control

The CRC document control procedures and standards rely on Adobe and Prolog software.

The CRC has a designated Project Control Manager responsible for maintaining the official project files. The primary document control goals for the CRC include the facilitation of capturing, properly indexing, securing, archiving, versioning, and keeping the project documents current.

All project files will be maintained at the CRC office. To ensure adherence with the overall document control goals, staff identified three primary types of documents:

- Reference material.
- Project work papers.
- Official project files.

Reference Material

Reference material includes any document (electronic or physical) that is not a direct product of the CRC, but is helpful or necessary in order to perform project functions. Reference material will be included in its own section of the project filing structure and will not follow the traditional WBS structure as designated for official project files.

The initiator of the reference material should coordinate with Document Control to determine the most appropriate placement of the information within the project library, thereby making the material available for all team members.

Project Work Papers

Project work papers include any document or file that is a direct product of the CRC, but that is not in its final or distribution draft format. Project work papers generally require further collaboration or processing among team members.

Official Project Files

An official project file is generally a product of the project. It can be either electronic or paper, and is in its final form. Final form includes drafts that are issued for review. Common, well known examples of official project files include contracts, correspondence, white papers, reports, meeting minutes, etc. Some other forms of project files that are often overlooked include e-mail communications, photos, and presentations. Following is the procedure for dealing with official project files.

Document Distribution and Filing Process

Project staff and task managers will be responsible for:

- Copying and distributing all items for internal team members.
- Assigning the document a file number in accordance with the Document Control Master WBS File Index Structure.
- Submitting them to Document Control for the official project file.

Document Security

In order to ensure the integrity of project files, the CRC project has developed permissions that enable users to view, edit, and delete certain documents depending on where these documents are located and what user group the individual is assigned to. The table below summarizes the basic users and their related permissions:

Location	Group	Default Permissions
Workpaper Files	All CRC Users	Add, Modify, Delete
Project Files (except DOT folder)	All CRC Users	Read Only
	Administrators, Document Control	Add, Modify, Delete
Project Files DOT Folders	All CRC Users	No Access
	DOT & Mgt Group	Read Only
	Administrators, Document Control	Add, Modify, Delete
Reference Files	All CRC Users	Read Only
	Administrators, Document Control	Add, Modify, Delete
Document Control In-Box	All CRC Users	Add
	Administrators, Document Control	Add, Modify, Delete

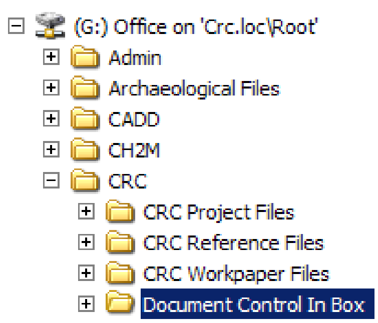
In order to be assigned to a user group, the person must have a CRC network login.

Some files that have contents that are not considered to be appropriate for widespread distribution are kept in the DOT folders.

Incoming Documents

The project staff and task managers will be responsible for submitting appropriate new items (correspondence, fax, e-mail, drawings, etc.) to Document Control for the official project file. This submittal can be in electronic or hard copy format depending on how it was received.

Electronic Format



If received in electronic format, a copy is placed in the electronic Document Control In Box (In Box) with an e-mail notification to Document Control describing the content of the electronic information that was placed in the In Box.

Paper Format

If the document is in paper format, then it is assigned a WBS code and placed in the Document Control In Box (Doc Box) for filing. Document Control will remove items from the Doc Box and, after processing, place them in the appropriate file.

Outgoing Documents

In general, outgoing documents (correspondence, fax, e-mail, etc.) will be in electronic format, generated by project staff and task managers from the CRC Work Paper files. However, there may be instances when the electronic correspondence includes a non-electronic attachment. If that is the case, the "paper format" procedure referenced above would apply. Also, a copy of the electronic document is placed in the In Box to be documented and filed into the official project filing system, as well as an e-mail notification to document control.

Data Entry Into Document Control Database

Document Control will collect documents from the Doc Box on a regular basis. After collecting material from the Doc Box, Document Control will enter in chronological order into the document control database consistent with the Master WBS File Code Index described below.

Document Control Software

The document control software programs that are to be used for the project are Adobe Acrobat and Prolog.

Prolog software is used by project staff to track:

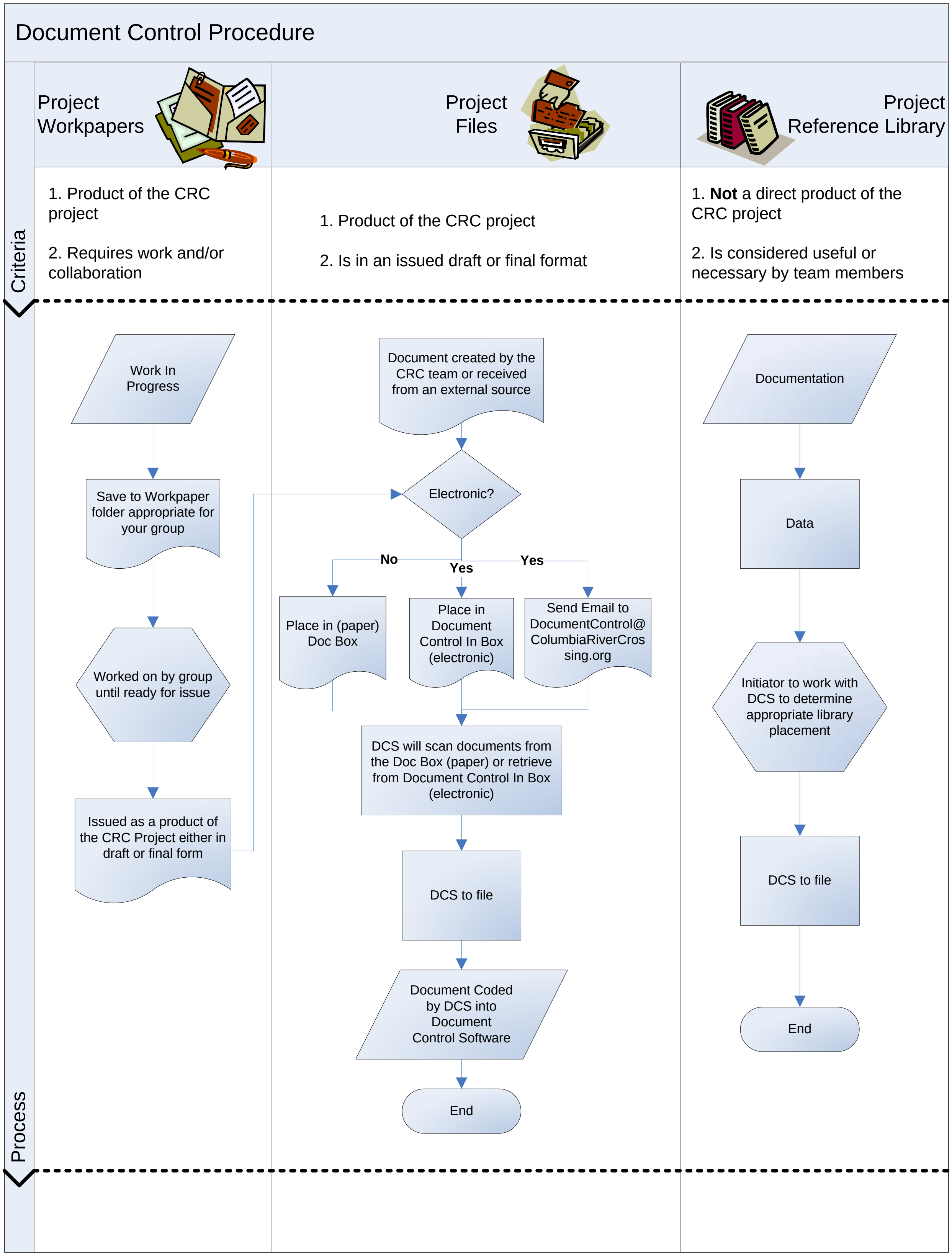
- Submittals
- Deliverables
- Quality Assurance/Quality Control (QA/QC) process of deliverables
- Versions
- Revisions
- Correspondence
- Public Comments
- Public Disclosure Requests
- Project Contracts
- Project Budget
- Project Invoices

Document Control Workflow

The Document Control work flow is shown below.

This page left blank intentionally.

Figure 2-5. Document Control Procedure



2.3 Investor Relations

As described below, the funding plan relies on numerous investors. The CRC will lead efforts to communicate, collaborate, and coordinate with investors including but not limited to:

- FTA
- FHWA
- Project Management Oversight Contractors
- Executive and elected officials
- Financial Institutions associated with interim financing

To best respond to particular questions as they arise and disseminate information to key staff throughout the project, these efforts will be supplemented as needed by experts from the project as well as partnering agencies.

2.3.1.1 Grant Administration – FTA

Overview

WSDOT, the grantee in collaboration with TriMet and C-TRAN as necessary, will administer grants in accordance with FTA Circular 5010.1D, Grant Management Requirements.

Grant Analysis and Administration

The Deputy Project Director and WSDOT Assistant Director for Transit, with assistance from CRC Project Control staff has responsibility to FTA for grant-related aspects of the project. Areas of responsibility include the following:

- Coordination of the development of the grant applications and amendments.
- Coordination of grant application-related required activities.
- Coordination of response to FTA application review comments.
- Facilitation and execution of grant agreements, and notification of approval to project management staff.
- Maintenance of grant files, including all grant applications, grant agreements, grant-related correspondence, quarterly reports, grant budgets, and revisions.
- Coordination of FTA quarterly report submittals and budget revisions.
- Distribution of Grant Status Reports and Labor Distribution Reports to project staff.
- Provision of information to appropriate project staff about new or changing federal grant-related requirements or regulations.

- Guidance to project staff on grant eligibility issues, budget management, and most appropriate use of grant resources.
- Preparation and distribution of monthly report with details on activities, schedule, forecast cost, and overall completion.

Grant Accounting

CRC performs the following accounting functions for grant management:

- Establishing all grant accounting information within the general ledger system.
- Processing grant-funded project invoices and charges.
- Producing monthly grant status reports and labor distribution reports.
- Preparing financial status reports for quarterly reports.
- Processing grant draw-down transactions.

Cash Management – FTA

The grantee, WSDOT is responsible for receiving and dispersing all project funds. CRC staff will be certified users of the TEAM system. The Deputy Project Director is an authorized user of TEAM. A force account plan in accordance with FTA Circular 5010.1D will be followed for transit.

The CRC intends to follow the most expeditious and cost effective development schedule, that is, progress on the project will not be delayed awaiting federal funds. Following Electronic Clearing House, Inc. (ECHO) procedures, typically CRC will draw on federal funds to reimburse costs already incurred, or, in some instances, in advance, for large expenditures that will be made within three days. When federal funds are not available due to appropriation cycles, local and/or interim financing will pay expenditures.

Grants Closeout

Upon completion of the Project, staff will prepare a report stating the actual expenditures on the project broken down by contract and FTA line item code. Other reports will be prepared in accordance with all appropriate rules and regulations.

Full Funding Grant Agreement Reporting

The Deputy Project Director is responsible for ensuring that CRC provides quarterly reports in FTA's electronic grant management system, against each element of the budget indicating physical progress. The CRC will provide a report of actual cash draw-down against approved grants. Explanation of any existing or potential problems will be noted.

Grant Audit

An additional element of FTA grant reporting is an audit verification of expenditures by outside independent and federal auditors, usually conducted annually within four months of the close of the fiscal year. FTA, WSDOT, TriMet, and any other contracted agency or partner organization, will coordinate the audit work. The audits verify compliance with procurement policies and procedures as outlined in its procurement certification and accepted cost principles.

2.3.1.2 Grant Administration – FHWA

Overview

CRC staff will lead efforts to administer grants in accordance with FHWA Guidelines.

Grant Analysis and Administration

WSDOT and ODOT, assisted as necessary by partner organizations, will handle grant-related aspects of the project as a normal course of business.

Grant Accounting

Currently, the WSDOT Office of Highways and Local Programs oversee the following accounting functions for grant management:

- Establishing all grant accounting information within the general ledger system.
- Processing grant-funded project invoices and charges.
- Producing monthly grant status reports and labor distribution reports.
- Preparing financial status reports for quarterly reports.
- Processing grant draw-down transactions.

Grants Closeout

WSDOT and ODOT, assisted as necessary by partner organizations, will handle closeout work for the project as a normal course of business.

2.4 Project Management Tools and Techniques

2.4.1 Introduction

There exist several tools and techniques employed by project managers to ensure the greatest quality product and production time. These tools are designed to enhance project development efficiency, while simultaneously providing a level of quality assurance for the product. While the discussions of these tools herein are described for the design phase, they can also be effective during the construction, maintenance, and operation phases. This PMP will update these tools and implementation needs as change occurs and schedule progresses.

2.4.2 Risk Management Plan

Risk analysis is treated separately from the base cost estimates. This enables a more rigorous and objective approach to this important component of the project, and includes anticipated variances in the base cost (for example, in unit costs and quantities) and impact of risk events. FTA and FHWA guidance both have similar components that risk management plans should provide.

The following components to a risk management plan provide a review of the planning steps:

- Identification
- Evaluation
- Analyses of treatment alternative, i.e., avoidance, prevention, mitigation/cost control, and insurance
- Assignment of Risk
- Selection of Risk Treatment
- Monitoring and Evaluation of treatment performance

Risk management identifies and evaluates options to reduce risks to acceptable levels within project constraints. The initial effort will address those uncertainties identified as having the greatest impact. Treatments may include, but are not limited to the following:

- Additional investigations/designs where such expenditures are cost-effective compared with potential impacts
- Construction contract language that apportions risk to the parties most able to control that risk
- Effective change management procedures

Where project proponents have little or no control over the uncertainty, treatment may involve little additional action beyond gaining a greater understanding of causal factors.

The Risk Management Plan and mitigation strategies will be expanded as project details are developed. The overall risk analysis will be reviewed on a periodic basis for validity and effectiveness. Where needed, the project team will perform additional measures to mitigate risks. These will include:

- Choosing an alternative response strategy
- Implementing a contingency plan
- Taking corrective actions
- Re-planning portions of the project

Active risk management plans will be maintained by each Task Manager and reported monthly to Senior Management Staff via Project Development Team (PDT) meetings. The task manager assigned to each risk will assess the effectiveness of the current strategy of the specific risk, any unanticipated effects, and any mid-course correction that the PDT must take to mitigate the risk.

Risk tracking will occur utilizing a basic spreadsheet developed by the WSDOT Cost Risk and Estimate Management (CREM) office and modified as necessary for transit elements based on TriMet procedures. This spreadsheet offers a straightforward method for tracking risks and a preliminary understanding of how to avoid or mitigate for risks if they occur. An example of this risk tracking spreadsheet can be found in Appendix E, Risk Tracking Matrix. Proper tracking and maintenance of risks enables internal and external communication of risks among partners, stakeholders, PDT managers, and staff. PDT identification and maintenance of risks will also enable effective communication of identified risks to independent teams during the required risk assessment workshops described below.

2.4.3 Risk Assessment Workshops

Due to the nature of a multimodal, multi-agency, bi-state project, there are specific requirements for Risk Assessments that need to be met by each agency. FHWA defaults to a proprietary risk assessment process developed by WSDOT called the CEVP. FTA follows a different Risk Assessment approach implemented at specific stages in the design development and funding approval processes. CRC will implement both types of risk assessment workshop strategies to satisfy multiple agency requirements, as well as provide the maximum benefit in risk management. The following sections describe these two processes and implementation timelines.

2.4.3.1 Cost Estimate Validation Process and Cost Risk Assessment

The CEVP and Cost Risk Assessment (CRA) are proven techniques for risk management and risk-based estimating. CEVP/CRA is a proprietary approach developed by WSDOT which utilizes a team of subject matter experts to identify and quantify uncertainty and risk in a workshop setting. WSDOT is required by Executive Order numbers E 1053.00, E 1038.00, and E 1032.01 to utilize this process. The CEVP/CRA process is endorsed by FHWA and ODOT as a proven and effective technique for risk management and risk-based estimating. While transit elements will be evaluated as part of this process, FTA has differing requirements needed to meet their goals for risk assessment. It is understood that this process will be implemented in addition to and not in place of the FTA risk assessment process, which is described in the next section of this document.

The Cost Estimate Validation Process is a risk analysis that combines the first three components of the risk management plan. The outcomes of the analysis are risk registers, risk-laden design and construction schedules, and projected ranges of total costs and expected completion dates. The risk register includes an estimate of the positive or negative potential impact in terms of cost and schedule, the probability, and the design/construction activity likely to be affected. The range of probable costs and completion dates varies from those with a 10 percent to a 90 percent probability of being exceeded. The ranges, which are estimated using a Monte Carlo simulation, include the effect of escalation. The range will decrease through design and construction until commissioning, when the cost and completion date become final.

The CEVP process is an intensive workshop that will generally be applied to the project as a whole. In some instances the Executive and Senior Management groups may choose to employ a CRA process to evaluate risks for specific areas of the project design/construction. The CRA process is an effective and proven method as a risk assessment strategy. Risks are identified in the same way as the CEVP process and also utilize the Monte Carlo simulation. The primary difference between the two processes are requirements for team make-up, described below.

In the CEVP/CRA process, the team makeup centers around interdisciplinary subject matter experts to provide an accurate assessment of risks based on firsthand knowledge and experience. CEVP process requires an independent team of outside subject matter experts, and CRA may utilize project or resource staff to aid in the risk assessment. These processes are organized through WSDOT's CREM Office and facilitated by either a CREM staff member or outside consultant employed by the CREM office and trained in CEVP/CRA methods and implementation.

For more information on the CEVP/CRA risk assessment approach, see the following website:

http://www.WSDOT.wa.gov/Projects/ProjectMgmt/RiskAssessment/

The CEVP/CRA process will be implemented at various phases in the project life. CRC has implemented both a CEVP and a CRA on the project to date. CRC is committed to continually performing risk assessment workshops to evaluate the monetary and schedule impacts of project risks at different phases in the project. The following summarizes risk assessment workshops and their schedule for implementation to date:

- Conceptual

  The CEVP was used to assess risk for the ten conceptual build alternatives evaluated in 2006. The CEVP identified the bridge across the Columbia River as one of the main sources of uncertainty and risk, and a program was implemented during the next phase of work to improve confidence in costs and schedule. The program included advancing design development and undertaking a preliminary geotechnical investigation, which included drilling holes in the Columbia River channel.

  The CEVP provided a comprehensive list of risks that formed a solid basis for the subsequent risk assessment update for the four preliminary build alternatives being evaluated for the DEIS. An update to evaluate the effectiveness of implemented recommendations followed with the less intensive WSDOT Cost Risk Assessment approach.

- 0-10% Design – CEVP

- 30% Design/Post-ROD – TBD

- 90% Design – TBD

2.4.3.2 FTA Risk Assessment

FTA has risk assessment protocols integrated into their funding mechanisms. A Risk Assessment is required during the New Starts Application evaluation process and prior to the Full Funding Grant Agreement approval. FTA utilizes a "Top-Down" process to provide evaluation for aspects of the project scope, project schedule, project estimate, grantee's capacity, program management, and management plan. This evaluation results in a judgment of risk by SCC category and type (market, bid, construction, or requirements) and a range of projected costs at various stages of project development. The results are used as a management tool to guide development of risk management strategies.

2.4.4 Value Engineering

CRC places a high degree of importance on VE studies. VE is a systematic process of review and analysis by a multi-disciplined team of persons not involved in the project. VE studies ensure that essential functions are procured at the lowest capital and life cycle cost, and that costs are consistent with needed performance, quality, reliability, aesthetics, safety, and operation. VE is an accepted structured process within the engineering industry and at least one formal VE Study is required by the following federal guidelines:

- Federal-aid Highway Act of 1970
- 23 CFR Part 627.1(a)
- National Highway System (NHS) Designation Act of 1995; Section 303(b)(f)(1) of Public Law 104-59
    - Requires states to perform at least one VE study for all federal-aid highway projects on the NHS with an estimated cost of $25 million or more.
- SAFETEA-LU, PL 109-59
    - Requires VE studies of bridge projects of $20 million or more.
- 49 USC 5309.I

For more information on VE, visit the following informational sites:

- http://www.wsdot.wa.gov/Design/ValueEngineering
- http://www.fhwa.dot.gov/ve/index.cfm
- http://www.transportation.org/
- http://www.value-eng.org/

Typically, a VE study for a project is done during the conceptual, schematic, and/or 30% design development stages. This timeframe typically allows for greatest cost effectiveness and functional benefit of the VE study, however, VE studies can be effective at any point during the design phase and for subject matter outside of design as well. VE studies will be coordinated through WSDOT's Value Engineering Program, which is a nationally recognized leader due to the large amount of VE studies conducted, compliance with federal requirements, and high implementation rate of VE recommendations. CRC procedures will be compatible with FTA guidance and practice.

Following WSDOT's VE policy and the Society for American Value Engineering (SAVE) international best practices, a job plan outlining the VE study phases and time allotment will be submitted by the VE facilitator and approved by the Design Manager(s). Every VE study will include investigation, speculation (brainstorm), evaluation, development, and presentation phases (see above web link for additional information). The presentation phase results in a report and presentation from the VE Study Team. The implementation phase is the responsibility of the Design Manager(s), requiring a formal response to VE recommendations indicating adoption or an explanation why the project team disagrees with any particular recommendation. Adoption of recommendations will only occur with appropriate notification to Executive, Senior, and Program Management on scope and budget revisions.

VE Studies are required to be led by a Certified Value Specialist (CVS) through SAVE International who must also be a licensed professional engineer.

VE Study team make-up is also an important function for a successful process to work. VE Study teams will be composed of interdisciplinary industry experts independent of the project team, to ensure an unbiased interest in the project design. Team make-up may vary depending on the scope of the study. Any VE effort involving transit design will have independent teams of specially qualified professionals including designers, C-TRAN and TriMet Capital Projects staff, Operations and Maintenance staff, and other consulting specialists, as appropriate.

Several VE studies have taken place to date, and several more are planned at regular intervals. Below is a list of studies conducted and planned:

- Study No. 1 – Transit Options – May 21-25, 2007
- Study No. 2 – River Crossing Options – May 21-25, 2007
- Study No. 3 – Washington Approach – June 4-8, 2007
- Study No. 4 – Oregon Approach – June 4-8, 2007
- Study No. 5 – 30% Design Evaluation – Summer 2009
- Study No. 6 – 60% Design Evaluation – Spring 2010
- Studies No. 7 and 8 – Design/Construction Specific – dates and content TBD

2.4.4.1 Value Engineering During Construction

During construction, further VE may be facilitated through specific contract language encouraging the contractor to identify further opportunities. This possibility will be explored further in final design, and this section will be updated at that time.

2.4.5 Constructability Reviews

Constructability is a matter of continual evaluation during the design process. All agencies have a variety of guidance on the amount and at what point constructability reviews take place in the process of design. Given the complexity of construction required both with the river crossing and the multimodal elements of CRC, constructability reviews have and will occur during the following phases:

- Conceptual/Schematic

  A conceptual constructability review was completed from June 16, 2008 to June 20, 2008. The constructability review panel provided feedback on several areas including staging, schedule durations, cost, risk identification, and ideas for improvement. A final report for the study provides detailed findings of the study.

- 30% Design
- 60% Design
- 90% Design
- PS&E Review

Near the completion of the final design phase, formal constructability reviews will be conducted for major civil and systems contract(s). However, all constructability reviews will make an effort to focus on the following elements listed:

- Completeness of scope
- Expectations for construction schedule
- Practicability of design
- Conformance to efficient field methodology
- Correctness of cross-references from drawing to drawing and detail clarity
- Agreement of intent between general conditions, special provisions, and technical sections of the specifications
- Compatibility of civil and systems construction

The Senior Management staff is responsible for the constructability review and may use any member of the design team, the construction team, outside professional consultants, or any other agency discipline as necessary, depending on expertise required. Constructability reviews for transit elements will be held concurrently with the highway constructability reviews. As these two elements are constructed within the same area, concurrent constructability reviews will aid in determining potential issues and overlapping construction problems with the two construction elements.

2.4.5.1 Contractor Outreach Meetings

In some instances, a consultant or construction contractor may perform a constructability review to provide an independent assessment of methods, sequence and phasing, contractor interface with other work, and general conditions language specific to each contract. This practice will aid in clear development of practical lessons learned, staging, plan and specification for a buildable product. WSDOT and some other partnering agencies have policies in place for contractor outreach prior to the bidding process should they administer the contract. These policies will be detailed in the next version of this plan.

2.4.5.2 New and Innovative Contracting Strategies

It is a responsibility of CRC to provide a quality product at best time and cost. New and Innovative Contracting Strategies must be evaluated and potentially implemented for successful project delivery. Several possibilities may exist depending on a combination of the agency(s) and funding source(s) involved with contract administration and construction. These strategies may involve various procurement methods including but not limited to Design-Build, Public-Private-Partnerships, Cost-plus-time bidding, CM @ Risk, lane rental, bid options, etc. The evaluation of these possible methods is ongoing through financial and policy group meetings. Further evaluation will continue during the preliminary engineering and final design phases. Additional discussion regarding procurement can be found in Section 2.5.

2.4.6 Partnering

Partnering can be seen throughout this PMP and in the project development. Everything about this multimodal, bi-state, multi-agency project is about establishing relationships leading to the successful delivery and product life of the CRC. The PDT composition demonstrates one aspect of partnering and consensus planning. Other successful demonstrations of partnering can be seen in the InterCEP, various working groups, PSC, etc. More information regarding these groups can be found in Section 2.7. Through partnering, CRC will provide the following:

- Level of organizational involvement and the professional facilitation for the key partnering processes, including any partnership development and team-building workshops
- Context Sensitive Solutions (CSS)
- A quality product that meets the needs of the community, stakeholders, and partners
- Document process to enhance working relationships in contract administration activities

2.5 Procurement and Contract Management

2.5.1 Overview

Agreements are legal and binding contracts and care needs to be taken in their preparation and execution. They affect the public, are binding upon the agency which enters into them, and often represent significant amounts of money.

When preparing an agreement, the CRC project will ensure that the wording of the agreement (contract) is legally sufficient and complies with applicable local ordinances, state law, and federal regulations, and with DOT and agency policy.

The agency preparing the agreement on behalf of the CRC project will ensure that the work and/or funds involved in the agreement comply with current policies and laws.

Ultimately, the Project Directors are the CRC Representative for all contractual obligations to the project. The functional and support teams support the Project Directors in all contractual aspects of this role. Whenever the Project Director is unable to attend to the project, delegation of signature authority is used.

2.5.1.1 Contracting Strategy

The CRC Project's contracting strategy must accommodate the project schedule and budget, anticipate the capabilities and limitations of the local contracting community, and satisfy all federal, state, and local requirements concerning contracting methodologies employed. There will be a complete procurement plan included as part of the CRC yearly revision after the record of decision has been approved.

The selection of contractors will conform to the contracting procedures of the state or agency leading the procurement effort and a competitive process will be used.

2.5.1.2 Current Contracting Guidance

Currently, the project utilizes the WSDOT Consultant Programs Division Procedures Manual which sets forth the minimum standards for processing professional service contracts. As the project progresses, those contracts processed by WSDOT will follow the WSDOT Construction Manual. Other agency manuals may apply if they become the contractee and to ensure compliance with FTA guidance and procedures (i.e., TriMet, C-TRAN, ODOT, etc.).

2.5.1.3 Currently Applicable Laws and Policies Governing CRC

All procurement transactions, regardless of whether by sealed bid or by negotiation and without regard to dollar value, except small purchases as defined by the WSDOT, ODOT, C-TRAN, and/or TriMet standards as appropriate, will be conducted in a manner that provides maximum open and free competition consistent with FTA Circular 4220.1F, Third-Party Contracting Guidelines, Department of Transportation 49 of the CFR Part 18, Employees' Code of Ethics, and WSDOT guidelines.

Applicable state law and policies governing the procurement practices of CRC include:

- Washington Administrative Code
  - WAC 458.20.101 – Tax registration and tax reporting
- Revised Code of Washington
  - RCW 18 – Business and Professions
  - RCW 18.08 – Architects
  - RCW 18.43 – Engineers and Land Surveyors
  - RCW 18.96 – Landscape Architects
  - RCW 39 – Public Contracts and Indebtedness

        - RCW 39.04 – Public Works
        - RCW 39.04.250 – Payments Received on Account of Work Performed by Sub-contractor – Disputed Amounts – Remedies. (Prompt Pay Law)
        - RCW 39.19 – Office of Minority and Women's Business Enterprises
        - RCW 39.29 – Personal Service Contracts
        - RCW 39.76.011 – Interest on Unpaid Public Contracts – When Payment is Considered to Be Made
        - RCW 39.80 – Contracts for Architectural and Engineering Services
    - RCW 48 – Insurance
    - RCW 51 – Industrial Insurance
    - RCW 81 – Transportation
    - RCW 81.104 – High-Capacity Transportation Systems
    - RCW 82 – Excise Taxes
        - RCW 82.32.030 – Registration certificates – Threshold levels
        - RCW 82.32.045 – Taxes – When due and payable – Reporting periods – Verified annual returns – Relief from filing requirements
- Oregon Revised Statutes
    - ORS 279A.060
    - Chapters 279A, 279B, and 279C (the Oregon Public Contracting Code)
- Washington and Oregon Statutory and Case Law
- Code of Federal Regulations
- Brooks Act – 40 USC Chapter 10 Subchapter VI – Selection of Architects and Engineers
- Federal Certification, Assurances, and Guidance
    - Civil Rights Act of 1964
      42 USC Chapter 21 Subchapter V Section 2000d through 2000d-4a – Federally Assisted Programs
    - Federal-aid Highway Act of 1973
      23 USC Chapter 3 Section 324 – Prohibition of Discrimination on the Basis of Sex
    - Rehabilitation Act of 1973
      29 USC Chapter 16 Subchapter VI Section 794 – Nondiscrimination Under Federal Grants and Programs

- Age Discrimination Act of 1975
  42 USC Chapter 76 Sections 6101 et seq – Age Discrimination in Federally Assisted Programs
- Justice System Improvement Act of 1979
  42 USC 3701 et seq
- Civil Rights Restoration Act of 1987
  Public Law 100-259
- American with Disabilities Act of 1990
  42 USC Chapter 126 Section 12101 et seq. – Equal Opportunity for Individuals with Disabilities
- Department of Transportation
  49 CFR Part 18, Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments
- Participation by Disadvantaged Business in Department of Transportation Programs, 49 CFR Part 26
- Department of Transportation's Final Rules on Department of Contractors, Subcontractors Performing Under Grants, 49 CFR Part 29
- Buy America, 49 CFR Part 661
- FTA's Master Grant Agreement
- FTA Circular 4220.1F, Third Party Contracting Guidelines, as revised.
- FTA's Best Practices Procurement Manual

TriMet has a history with the FTA and complies with FTA guidelines regarding "self-certification" from FTA in accordance with Circular 4220.1F. All TriMet staff involved in procurements must strictly comply with the governing procedures referenced above. FTA audits TriMet's compliance at the Triennial Procurement review. WSDOT anticipates meeting the same requirements in its status as an FTA grantee.

2.5.1.4 Administering CRC Project Contracts

The administration of Agreements and Contracts involves many different subject areas, each with clearly delineated rules and procedures and focusing on specific Contract provisions. Contract Administration is also governed by a great number of rules emanating from statutes, regulations, and decisions. These rules affect the rights and duties of both parties and determine the types of actions of the CRC Team that will be binding on the Project. The structure of the Contract is based on these rules. Personnel responsible for administering the Project Contract will adhere to these guidelines established by the several areas of the Contract. Please see Section 2.5.1.3 Overview for a listing of the rules and regulations.

CRC will draw upon existing procedures and systems that are in place, and best management practices from the participating agencies when administering contracts. The following issues will be resolved in a timely manner:

1. Change contract specifications when they no longer reflect the requirements of the Project.

2. Resolution of Contractor difficulties when the Contractor is unable to carry out part of the Contract or has failed (or is failing) to meet one of its Contract obligations.
3. Help the Contractors when difficulties are encountered in meeting the Contract requirements.
4. Provide Contractual input to the development of Contract Documents.
5. Participate in all Contract negotiations.
6. Prepare Contract supplemental agreements.
7. Prepare all Contract changes.
8. Participate in all meetings with the Contractor where Contractual issues are decided.
9. Perform a lead role in developing Project positions and responding to Contractor claims.
10. Establish an "arm's-length" but cooperative relationship with the Contractors in the performance of the work.
11. Facilitate the development of mutual confidence and respect between the Project and Contractor officials.
12. Properly document Contract events, timely identify problems, and work out mutually agreeable solutions.
13. Be constantly aware of the obligation of Contracts Administration to protect the public interest.
14. When it is necessary to deviate from the Contract specifications or to permit the Contractors to perform less work than called for by the Contract, maintain the integrity of the procurement system by obtaining consideration for the reduction in the Contractor's obligation.

2.5.2 Procurement Plan

2.5.2.1 Personal Services: Project Management, Design, and Legal

Personal Service contracts are used to obtain specialized services requiring formal training and technical experience. Personal Service contracts include, but are not limited to, contracts for Project Management Services, Design Services, and Legal Services. Currently WSDOT is responsible for managing all CRC Contracts through the Project Director.

2.5.2.2 Construction Contracts

The Contract Administrator is responsible for publication of contract advertisements as described above. All contracts will be advertised on WSDOT's electronic advertising system and/or on TriMet/C-TRAN systems, as appropriate.

Under TriMet's E-Bid system, E-mail notification of all available solicitation opportunities is sent to all contractors who are registered on this system for the relevant type of work. Currently, over 5,000 contractors are registered on E-bid, as well as several plan centers. The plan centers notify their members of relevant TriMet solicitations. TriMet will also advertise contracts with an estimated value of more than $125,000 in at least one trade newspaper of general statewide circulation. Advertisements will appear at least 30 days prior to the bid opening for large contracts and 21 days for smaller contracts unless exigent circumstances dictate a shorter minimum notice period.

It will be typical practice to hold a pre-bid or pre-proposal conference for larger contracts, after advertisements and before bids or proposals are due. This meeting is open to all interested parties and is conducted by the Contract Administrator and the resident engineer (RE). At this conference, the work is discussed and potential bidders are encouraged to ask questions about the solicitation document.

Non Low-Bid Competitive Procurement

The use of non low-bid competitive procurement varies between the two states. While Washington state law has some special provisions for alternative procurement, the requirements are substantial and rarely used. In contrast, Oregon law permits the use of alternative procurement methods. The rules governing their use include development of formal findings, publication of the availability of the findings public hearing, and post-contract evaluation. Contracts and legal staff administer the process. The TriMet Contract Review Board approves specific contract exemptions.

The nature of the work solicited is generally the impetus for selection of a non-low-bid method of procurement. Situations where an alternative method of procurement might be used include:

- Exceptionally complex or quality/safety/time-sensitive construction work, where trade-offs between cost and quality, safety, time of performance, or other factors are of heightened importance;
- Construction contracts that are managed in non-traditional ways, where factors such as prior experience or design expertise are critical to good performance; or
- Systems elements (e.g., light rail vehicles, traction electrification, signals, communications, and fare collection equipment) that are provided on a "design-furnish-install" basis and where price is dependent on the design and equipment unique to each provider.

2.5.2.3 Light Rail Vehicle Procurement

The CRC project will draw upon TriMet's success with Light Rail Vehicle Procurement. The light rail vehicle procurement will follow a competitive negotiation type process with WSDOT, TriMet, and C-TRAN coordinating and preparing a detailed Technical Specification and a Request for Proposals. An evaluation committee will review and score proposals on a combination of technical factors and price, and establish a competitive range. In the second step, proposers in the competitive range will meet with the evaluation committee to explore ways to improve their proposed designs, and then submit Best-and-Final Offers. The evaluation committee will make a final selection using a combination of technical factors and price, including pricing of any options.

The contract will include a federal requirement section which incorporates the contractor's responsibilities regarding clean air, clean water, environmental compliance, energy conservation, privacy, cargo preference, Fly America, seismic safety, Buy America, recycled products, and notification of federal participation. The Systems Engineering Director and the vehicle contract Resident Engineer will ensure compliance.

The contractor will design the vehicle according to contract criteria, which will specify vehicle configuration; critical dimensions; weight and passenger loading; operating environment; supply voltages; performance requirements; noise, vibration, and ride quality; electromagnetic interference and compatibility; mock-ups and samples; reliability; maintainability; and system safety program. As noted above, the selected contractor will be required to comply with Buy America provisions for rolling stock, including with pre-award and post-delivery audits. TriMet has engaged its independent auditors to perform these audits.

WSDOT, TriMet, and C-TRAN will assign an RE or Project Engineer to manage the procurement, design, manufacture, and testing of the vehicles. The vehicle RE reports to the Systems Engineering Director. Management will be in accordance with the Resident Engineers Manual, which includes procedures for contract changes that require consideration by the Contract Control Board.

Light Rail Vehicle Procurement Management

The selected contractor will be required to designate a project manager and submit a management plan. Required elements in the plan include:

- Organization chart, including all primary personnel involved in the contract
- Management chart depicting design, manufacturing, and testing responsibilities of the contractor and each subcontractor
- Progress schedule, including deliverables and milestones
- Quality assurance plan
- Systems integration plan

Light Rail Vehicle Procurement Management – Design

Details associated with this will be finalized following a negotiated procurement.

Light Rail Vehicle Procurement – Manufacture

Details associated with this will be finalized following a negotiated procurement.

2.5.2.4 Invoices and Accounting

The initial receiving point for all CRC invoices is the management staff at the CRC office to ensure consistent tracking. Each invoice is routed to the appropriate contract manager for arithmetic check, verification of work, and approval.

A technical specialist reviews invoices to check for compliance with budget and procurement requirements and for assignment or confirmation of WBS categorization. Invoices are forwarded to senior project management before being forwarded to WSDOT Regional Program Management for payment.

Invoice information will be entered into the Prolog cost tracking system. The CRC Project Control team will provide information to WSDOT Program Management detailing payments and amounts of all dispersed funds as directed. This process allows reconciliation of requests for payment from Prolog with actual disbursement of funds.

Detailed records of work performed are kept, and cost trends and overall contract progress are reviewed with the task managers and project managers. Contract managers and/or contract compliance specialists are responsible to assure that costs conform to the applicable federal regulations. On a monthly basis, the Project Control team compares the information in Prolog with the WSDOT general ledger systems and makes any needed adjusting entries.

2.6 Labor Relations and Policy

2.6.1 Labor Relations

For all DOT projects, all unions represented on projects or operations overseen by the DOT are kept informed of the project at one or more key milestones. In addition, information is submitted to the Department of Labor for review.

Specifically related to the transit portion of the project, the Amalgamated Transit Union (ATU), Local 757, represents the majority of TriMet's Operations Division employees under a working and wage agreement and the majority of C-TRAN's operations staff. When new light rail segments are constructed, TriMet and the ATU discuss and resolve issues associated with the transition of the new light rail service from construction to revenue producing status. These resolutions are commonly memorialized in written agreements.

The union leadership will be kept informed about the progress of the light rail design and construction phases so productive discussion, if needed, can be held as appropriate prior to start-up of revenue service.

TriMet, C-TRAN, and their contractors are in compliance with Executive Order 13202, "Preservation of Open Competition and Government Neutrality Towards Government Contractors' Labor Relations on Federal and Federally-funded Construction Projects," as amended by Executive Order No. 13208.

2.6.2 Certified Payroll Wage and Hour Requirements

Workers will be subject to the federal Davis-Bacon Act. Each contractor will be required to submit certified payroll data to confirm compliance with the Davis-Bacon Act. Program Management's Contract Compliance Officer will review the certified payroll statements. When ODOT, WSDOT, C-TRAN, or TriMet receives a wage complaint or discovers a discrepancy, omission, or other inconsistency in the certified payroll records, Program Management staff will investigate by conferring with the appropriate legal counsel, the contract manager, and the complainant. In some cases, staff may confer with the Bureau of Labor and Industry.

2.6.3 Human Resources

The Executive Director of Human Resources (HR) directs the division's functions and staff for each appropriate agency. The HR Director manages recruitment and selection, compensation and benefits, and performance management activities and associated staff. The Labor Relations Director manages labor union relations and grievance processes, employee relations, and associated staff.

The HR Division at TriMet will provide support and coordinate as needed along with C-TRAN for LRT HR activities.

2.6.4 Affirmative Action Program

ODOT, WSDOT, TriMet, C-TRAN, and its partners are committed to ensuring that the CRC workforce reflects the diversity of the local area, as well as ensuring that local businesses, Disadvantaged Business Enterprises (DBEs), and emerging small businesses are able to participate in the CRC to the greatest extent feasible. Contractors will be expected to share in this commitment. The appropriate State and Federal Affirmative Action Programs will be followed dependent upon the contract advertised and let by either ODOT, WSDOT, TriMet, C-TRAN, or other partners.

CRC, consultants, contractors, and suppliers will comply with federal regulations dealing with equal employment opportunities, prevailing wages, and other elements of affirmative action.

During the performance of any construction or consulting work, CRC contractors will not discriminate against any employees or applicant for employment because of race, religion, color, sex, age, physical handicap, or national origin. Contractors will take affirmative action to ensure that employees are treated equally during employment without regard to their race, color, religion, sex, age, physical handicap, or national origin. Such action will include – but not be limited to – employment, upgrading, demotion, or transfer, recruitment or recruitment advertising, lay-off or termination, rates of pay or other forms of compensation, and selection for training including apprenticeship.

2.6.4.1 Compliance with Regulations

The CRC project will require all contractors to comply with the regulations relative to nondiscrimination in federally assisted programs of the Department of Transportation presented in Title 49, CFR, Part 21, as revised. Enforcement of the regulations is the responsibility of the Contracts Compliance Officer in Program Management.

2.6.4.2 Solicitations for Subcontractors

In all solicitations made by a contractor, either by competitive bidding or negotiation, and including procurement of materials or leases of equipment, each potential subcontractor or supplier will be notified of the contractor's obligations under the contract relative to nondiscrimination on the grounds of race, color, or national origin.

2.6.4.3 Information and Report

Contractors will provide all information and reports required by regulations. In addition, contractors will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the CRC, WSDOT, TriMet, FHWA, or FTA to be pertinent to ascertain compliance with regulations. If a subcontractor fails or refuses to furnish such information, the contractor will so certify to the CRC as appropriate, and will set forth whatever efforts it has made to obtain the information.

2.6.4.4 Sanctions for Noncompliance

In the event of a contractor's noncompliance with the nondiscrimination provisions of a contract, CRC will impose such contract sanctions as the project may determine appropriate, including, but not limited to the following:

- Withholding payments to the contractor under the contract until the contractor complies; and
- Termination or suspension of the contract in whole or in part.

2.6.5 Disadvantaged Business Enterprise (DBE) Program

ODOT, WSDOT, TriMet, and C-TRAN all have DBE programs that will be followed per the contracts and in compliance with FTA and FHWA requirements.

The purpose of the DBE Program is to provide equal opportunity to minorities and women in contracting. The CRC Project utilizes procedures of WSDOT as its grantee. WSDOT has developed guidelines and procedures to ensure that DBEs have an equitable opportunity to compete for contracts, subcontracts, and agreements.

WSDOT endeavors to provide assurances to the U.S. Department of Transportation (USDOT) that WSDOT and its subrecipients of federal financial assistance will comply with federal mandates regarding the DBE Program.

2.6.5.1 DBE Liaison Officer

WSDOT, ODOT, C-TRAN, TriMet, and its partners have designated DBE Officers, and dependent upon the contract, the Officer will monitor the CRC project.

The External Civil Rights Branch (ECRB) of WSDOT is responsible for fostering equal opportunity in procurement contracting and service delivery through the administration of various equal opportunity programs. The ECRB is guided by the Transportation Commission's Policy Statement on Civil Rights, various other department policies, and federal and state civil rights laws and regulations.

TriMet's Office of Diversity and Transit Equity Senior Director is the DBE Liaison Officer (DBELO). The DBELO is responsible to develop, implement, and monitor all aspects of the DBE program, in cooperation with TriMet's Procurement and Contracts, and ensure that TriMet complies with all provisions of 49 CFR Part 26.

2.7 Community Relations

The CRC is the largest public works project in the region and has generated considerable interest among the public and the press. To ensure consistent information and to facilitate dependable lines of communication with the public, CRC is employing an extensive community relations function.

In order to communicate CRC to the public and stakeholders, CRC management has assembled an integrated inter-agency communications team. The team is comprised of a DOT, C-TRAN, TriMet, and Consultant combined communication and public information team to effectively speak with "one voice." The CRC Communications Manager has ultimate authority over all public materials, events, workshops, and communications published by CRC.

This update outlines the issues, strategies, and activities in the CRC project communications plan for summer 2008 - fall 2009.

2.7.1 Purpose of Community Relations

The purpose of Community Relations is to:

- Ensure Public Involvement and Community Relations efforts.
- Support specific neighborhoods during design and construction.
- Assist engineering and design staff when responding to questions.

The goal is to ensure that the public's opinions are understood and to mitigate disruptive or harmful effects of construction in the neighborhoods and for businesses along the route. The purpose will be accomplished through activities designed to:

- Build broad public awareness of, and support for CRC.
- Establish regular communications with neighborhood organizations to build trust.
- Resolve problems by working directly with residents, businesses, and property owners.
- Provide information during construction to allow affected properties and transportation system users to perceive and experience as little inconvenience as possible.
- Provide increasingly more detailed safety and operational information as LRT moves toward system testing, preview rides, and ultimately revenue service.

2.7.2 Communication Plan Goals

- Identify tools and implement strategies to assist the community, decision makers, and other stakeholders in developing ownership and support for the project by building awareness of the project and its benefits.
- Support the continued efforts to provide relevant, timely, and useful project information to all audiences affected by and interested in the CRC project.

- Further develop opportunities for meaningful and tangible public involvement and engagement in the project development process.
- Provide project staff and partners with key messages, materials, and information to speak with "one voice" about the project.
- Proactively convey current status information to the media and public, including scheduled milestone completion dates; significant contacts advertised, awarded, or completed; and total cost projections.
- Proactively convey updated commuter and traffic information, including traffic pattern changes, periods of lane closures, traffic delays, work zone accidents, alternate routes available, and alternate forms of transportation available (including benefits and possible subsidies).
- Proactively convey and mitigate, to the greatest extent possible, construction impacts to the local residents and businesses.
- Respond timely to media and public questions and requests for information.
- Build awareness and understanding of CRC benefits to the region.
- Proactively document and respond to reasonable issues or concerns that are expressed.

2.7.3 Upcoming Project Milestones

- Publishing of FEIS – Spring/Summer 2010
- Record of Decision – Summer 2010
- Begin Preliminary Engineering – Summer 2009
- Final Design Complete – Summer 2012
- Construction Begins – Winter 2012

2.7.4 Communications Audiences

Project area residents and other stakeholders have multiple and distinct interests in the CRC project. Identifying those interests will help the project team communicate more effectively with those interested and potentially impacted by the project.

2.7.5 Communications Issues

The project must gather support from policy, general public, and I-5 corridor audiences on a variety of issues. Some issues require specific engagement strategies and activities, while others may be communicated to the public and press via messaging, materials, and media contacts.

2.7.6 Communications Activities – Outreach

2.7.6.1 Policy Level

- Jurisdictional, institutional, and elected official briefings, community, business, and employer organization briefings
- PSC and SASS meetings
- Bi-State Coordinating Committee

2.7.6.2 General Public

Fairs, Festivals, and Community Events

The project team will focus on reaching people where they are in order to engage a broader range of people through outreach efforts. These include major community events held during the summer as well as events targeted to reach Russian, Vietnamese, and Spanish speakers.

Open Houses

Two sets of public open houses are typically held for the general public, advisory group members, and project stakeholders before key project decisions and milestones. Topics and dates include:

- Update on key decisions – December 2008
- December 2, 2008 – Vancouver
- December 3, 2008 – Portland
- Light Rail Transit Specific – January 2008
- January 10, 2009 – Light Rail Alignment Walking Tour – Vancouver
- FEIS – Spring/Summer 2010

Civic and Business Groups – Updates and Briefings

The project will provide these groups with updates to build support and understanding of the LPA, including: benefits, key decisions, and related issues like tolling, financing, mitigation, and sustainability. It is critical to continue outreach to these groups because their members are from both the project area and the region.

Property Owners, Business Owners and Managers, and Residents

Along the transit alignment, CRC staff will make one-on-one contacts periodically with property or business owners, managers, and residents along the alignment to share information and solicit comments. Owners of properties with potential impacts on bridge/transit/highway alignment have been offered one-on-one contact with staff since CRC started.

Drop-in Events

Informal meetings will be held in and out of the project area with detailed project information available for review and for Question and Answer discussion with project staff.

2.7.6.3 Project Area

Neighborhood and Community Outreach

The project will maintain and build relationship with BIA residents in these neighborhoods in Portland and Vancouver: Portland-Hayden Island, Bridgeton, East Columbia and Kenton; Vancouver-Esther Short, Arnada, Hudson's Bay, Shumway, Lincoln, and the Rosemere/Rose Village neighborhoods.

The project team will continue to expand information sharing and coordination with Clark County and City of Portland neighborhood coalitions to ensure project emails and print materials are getting wider distribution in the metropolitan region.

Advisory Groups

The work of the project's eight advisory groups will continue throughout the project development process. Each group will focus on specific key issues for the design refinements and the publication of the FEIS in fall 2009. Additional groups or sub-groups may be created to address specific time-sensitive project concerns. All groups currently meet on a scheduled monthly or bi-weekly basis as needed.

Most groups are facilitated by a CRC Consultant Task Manager or Senior Manager. CRC Task Managers or Senior Managers provide oversight to the facilitator and groups throughout the process. In some instances CRC has hired consultant facilitators independent of the CRC staff, as is the case with the Marine Drive Stakeholders Group. Meeting minutes will be taken at each meeting to document the group discussions and recommendations. Information and recommendations from these advisory groups are presented to CRC Task Managers during regularly scheduled PDT Meetings by the groups' facilitators and/or oversight personnel (see Section 4.3.3).

Current Groups

- Community and Environmental Justice Group (CEJG)
- Pedestrian and Bicycle Advisory Committee (PBAC)
- Freight Working Group (FWG)
- Urban Design Advisory Group (UDAG)
- Vancouver Working Group (VWG)
- Portland Working Group (PWG)
- Marine Drive Stakeholders Group (MDSG)

Workshops

Design workshops will provide area residents with hands-on opportunities to learn about, and make recommendations on, project elements including the number of auxiliary lanes, interchange design, transit location, and design. Below are the conducted and planned workshops through the FEIS processes; additional workshops can be planned as necessary.

- Transit Workshops
    - January 10, 2009 – Light Rail Alignment Workshop
    - January 14, 2009 – Light Rail Alignment Workshop

Fairs, Festivals, and Community Events (described above)

Open Houses (described above)

2.7.6.4 Communication Strategies – Web

Monthly Email Updates

Monthly Email updates will provide regular updates to all those on the CRC mailing list.

Website

The project website will be updated with new text and graphics regularly. New project information will be added as necessary to accurately reflect current project status.

Feedback Mailbox

Inquiries received by the project via email will be responded to by staff and returned to the constituent within five working days.

2.7.6.5 Communications Strategies – Printed Materials

Fact Sheets

CRC will create fact sheets on topics including transit alignment, interchange design, the number of auxiliary lanes, tolling, and finance. Current fact sheets will continue to be updated while new ones will be developed as needed.

Presentation Materials

To support outreach (advisory groups, business, community, elected, neighborhood, other) the project will create the following presentation materials and others as appropriate:

- Display boards
- Maps
- Slides

- Static displays

Newsletters

CRC will produce newsletters at major milestones and for updates on the project development process, including the release of the FEIS. Newsletters will be mailed to the project mailing list, translated into Russian, Spanish, and Vietnamese, and distributed at public events and project meetings. Also, the CRC will submit articles to the newsletters and publications of local partner agencies.

Display Boards

Display boards will be created for open houses, booths at fairs and festivals, traveling static displays, and miscellaneous presentations.

Advertising

The project will work with C-TRAN and TriMet to seek co-sponsored advertising on buses and light rail trains about the project.

2.7.6.6 Communications Strategies – Media

Media relations will be lead by the project owners and supported by the consultant team.

2.7.6.7 Reporter Briefings and Materials

Members of the media will receive project briefings at key milestones. Press kits could include project descriptions, graphics, timelines, and key decision dates. The press kits will serve as a tool for the accurate and updated transmittal of new project information and details.

2.7.6.8 Editorial Board Briefings

Editorial board meetings will be scheduled with a variety of publications within Clark and Multnomah Counties in an effort to inform the editorial boards and their reporters of the project. A team of trained project staff will be formed to provide these types of briefings to the media.

Minority and Small Press

Minority and neighborhood-based media will be kept informed about the project through the distribution of press materials, reporter and editorial briefings, and monthly email updates. Press releases will be translated as needed.

Key Messages – In Process

- CRC is a bridge, transit, and highway project to more efficiently move people and goods across the Columbia River between Portland and Vancouver. It expands people's options for improved travel between the two cities and throughout the region.
  - A long-term comprehensive solution is needed to improve mobility and safety on I-5 and across the Interstate Bridge.
  - Transportation is the backbone of a vibrant, economically healthy community.

- All people should be able to travel safely and efficiently—in their cars, on transit, on their bikes, or on foot.

2.8 Funding Plan

A separate Section 5309 New Starts PE Application and Criteria Report includes a detailed financial plan that describes the project's expected resources and requirements.

Refinements to this plan can be expected during PE. In summary, the funding plans:

- Draw on a combination of local, state, and federal funds, as well as State of Washington tolling credits and bridge tolls.
- Include an interim borrowing program to insure cash flow supports the most cost effective development schedule.
- Benefit from placing cost responsibilities with those most able to manage them.

2.8.1 Funding Agreements

During the PE phase the funding plan will be finalized with local governments.

2.8.1.1 Design Services Agreements

Negotiations between WSDOT, TriMet, and C-TRAN and several local jurisdictions will be undertaken to define the process and fee structure for obtaining permits and services related to utility relocations and reconstruction, land use, construction management, inspections, street lighting, traffic engineering, parks, street trees, planning and plan reviews, fire permits, and all other permits/procedures required by the respective jurisdictions.

Separate agreements will be negotiated with several entities including, but not limited to:

- City of Portland
- City of Vancouver
- ODOT
- WSDOT
- C-TRAN
- TriMet

The terms and conditions of such cost reimbursement agreements using FTA grant funds will be in writing, incorporate required FTA contract requirements, and identify the correct federal cost standards applicable to the work.

In general, the design service agreements establish a project manager in each jurisdiction who will act as the "point of contact" for CRC's Project Director. The agreements also establish the mechanisms by which local jurisdictions will accept improvements in their rights-of-way for local maintenance, generally involving a joint WSDOT/local agency inspection effort.

Jurisdictions performing work for the CRC under design service agreements will submit invoices to CRC under the terms of the agreements. These invoices are subject to the same review and approval process as other contracts.

2.9 Permitting

2.9.1 Environmental Assessment, Mitigation, and Monitoring

The FEIS is expected to be published in late 2009, followed closely by the Record of Decision (ROD) in 2009/early 2010.

The FEIS will identify measures to mitigate Project impacts. The mitigation measures will address:

- Land use and economic activity.
- Displacements, social, and neighborhood impacts.
- Visual and aesthetic qualities.
- Air quality impacts.
- Noise and vibration impacts.
- Ecosystems.
- Water quality; geology, soils, and seismic impacts.
- Hazardous materials.
- Safety and security.
- Construction impacts.
- Transportation mitigation.
- Historic resources.
- Public parks and recreation areas – Section 4(f) resources.

2.9.2 Regulatory Agency Coordination

As a bi-state project the Columbia River Crossing project is subject to both Oregon and Washington regulations, as well as many federal requirements. The project team worked with state and federal agencies to develop an effective approach for coordinating their involvement, and streamlining regulatory reviews and permits. The result is explained in the Interstate Collaborative Environmental Process (InterCEP) Agreement.

The goal of InterCEP is to allow the CRC project to efficiently plan, design, and build a solution that successfully addresses the project's goals and meets state and federal environmental regulations. The following regulatory agencies signed the InterCEP Agreement:

- National Marine Fisheries Service
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- Washington State Department of Ecology
- Washington State Department of Fish and Wildlife
- Washington State Department of Archaeology and Historic Preservation
- Oregon Department of Fish and Wildlife
- Oregon Department of Land Conservation and Development
- Oregon Department of State Lands
- Oregon State Historic Preservation Office
- Oregon Department of Environmental Quality

The main goal of this process is to ensure the project development team is aware of any potential concerns that could complicate the permitting process in the final proposed project. In addition, the project team engages in an ongoing dialogue with the necessary state and federal agencies prior to making major decisions. By getting approval at key milestones, CRC project managers can work toward reducing environmental impacts and avoid delays often associated with large scale projects.

InterCEP serves as a key advisory group to the CRC project, providing formal feedback to the project development team at milestones including, but not limited to:

- Project Purpose and Need
- Screening Criteria for Alternatives
- Methods for analyzing impacts
- Range of Alternatives to carry into the DEIS
- Preliminary Draft EIS
- Draft EIS
- Biological Assessment

- Final EIS
- Environmental Permitting

2.9.3 Monitoring

The CRC will ensure that all environmental commitments are included in the design and construction of the project, and that a proactive approach will be used for overseeing and inspecting environmental work during construction to help guard against cost overruns and schedule delays.

During PE, a plan to verify follow through of commitments in the National Environmental Policy Act (NEPA) document, environmental permits, and other environmental approvals will be created and will include the following areas:

- Roles and responsibilities of the environmental monitoring staff.
- Strategic stationing or positioning of staff members to maintain constant contact with resource agencies and a working knowledge environmental issues to ensure that all FEIS and permit commitments are addressed.
- Description of proactive coordination with the resource agencies during the project design and construction, in order to ensure early and constant communications of issues and requirements.
- Identification of fluctuating work schedules among the environmental monitoring staff members to ensure constant coverage of key contractor schedules and activities that may affect the environment.
- Coordination of environmental monitoring staff members' daily activities with the project management and construction management teams, in order to monitor and observe critical contractor activities.
- Record keeping and reporting procedures.
- Noncompliance and violation procedures.
- Permit modification procedures related to construction activities, including strategies for guarding against cost overruns and schedule delays while still acting as a good steward to the environment.
- Post-construction environmental performance for wetlands, stormwater, vegetation, wildlife crossings, endangered species, etc.

2.9.4 Federal Permits and Approvals

Agreements and permits with various federal agencies will be required. These agreements will be put in place during the final design phase. Agreements include:

- Environmental – Through FTA's Record of Decision on the FEIS.

- Department of Interior – Formal approval for mitigation measures addressing impacts on parklands as provided for in 4(f) Report. No 4(f) issues are anticipated.
- Advisory Council for Historic Preservation – For approval of the memorandum of agreement for mitigation measures addressing impact on designated historic properties, as provided for in Section 106 Report.
- Corps of Engineers, Hydraulic Permit Approval, and others.
- Federal Aviation Administration (FAA) approvals.
- United States Coast Guard Permit(s).

2.9.5 State Agency Permits

Permits from both Washington and Oregon agencies will be required regarding issues under their respective jurisdictions. These agreements will be negotiated and placed during the PE and final design phases. The Project Environmental Manager is responsible to monitor status and ensure timely execution of state agency permits.

2.9.6 Local Permits and Agreements

Permits and agreements with local governments in both Washington and Oregon will be required. These agreements will be negotiated and in place during the PE and final design phases. Responsibility for obtaining land use permits lies with the appropriate Design Manager and RE (for transit-related elements).

2.9.7 Railroad Agreements

Railroad Agreements will be pursued in the PE phase. The one location that would require an agreement is the grade-separated crossing of Burlington Northern Sante Fe (BNSF) at the south end of downtown Vancouver, where the freeway bridge and light rail will pass over the freight tracks.

2.9.8 Private Utility Interface

Numerous private utility companies maintain facilities that will be affected by construction activities or permanent facilities. During PE, composite utility base maps were created based on information gathered in meetings with the individual utilities and other means. Preliminary relocation plans and schedules will be developed in consultation with the specific utilities.

During final design, CRC will continue working with the individual utilities to agree on specific details establishing the impacts to the utilities' facilities. Each utility shall be responsible to prepare the work plans and relocate their infrastructure in advance of work in the area.

Because private utilities generally pay their own costs for relocation, written agreements with private utility companies are often difficult to obtain. Nevertheless, CRC has the responsibility to manage and facilitate private utility relocation so as not to negatively impact the schedule. Through cooperation and careful coordination, ODOT, WSDOT, and TriMet have had great success in this area on previous projects.

The Project Highway Manager, through its Utility Engineer, is responsible to manage coordination of private utility relocation within budget and schedule constraints. The Utility Engineer works with the Project Scheduler to minimize schedule impacts.

2.9.9 Continuing Control

As part of the real estate acquisition process, CRC partner agencies will establish continuing control agreements with state and local jurisdictions whose right-of-way is necessary for the construction, operation, and maintenance. These agreements will establish the respective responsibilities of the jurisdictions and CRC with regard to continuing control. Agreements will be required between:

- ODOT
- WSDOT
- City of Vancouver
- City of Portland
- C-TRAN
- TriMet

CRC contract staff, with support from the Washington Attorney Generals office and TriMet deputy general counsel, with assistance as necessary from TriMet's general counsel, will be responsible for drafting, executing, and updating the agreements.

2.10 Real Estate Acquisition, Property Management, and Land Development

2.10.1 Scope and Purpose

The acquisition, management, and relocation functions of the program, in accordance with the Real Estate Acquisition Management Plan (RAMP), achieve three objectives:

- Timely availability of property for LRT construction
- Appropriate handling of property after acquisition
- Uniform and equitable treatment of those displaced from their homes or businesses

Detail, including staffing, authority, and procedural guidelines, is provided in the separate RAMP.

2.11 Quality Assurance and Quality Control

At the time of printing, since TriMet's program has been vetted by FTA, the CRC is planning to develop the project using a coordinated approach using TriMet's current QA/QC guidelines and WSDOT's guidelines. It is anticipated that C-TRAN and ODOT will participate and follow these guidelines for this project to aid in QA/QC procedures.

The object of quality assurance and quality control activities is to assure that all facilities are designed, procured, and constructed in accordance with established engineering criteria and state and federal requirements. This section describes the initial plans for an effective quality assurance program.

The following are the definitions of quality assurance and quality control:

- Quality Assurance (QA) – Actions taken to provide adequate confidence that work conforms to established standards.
  - QA is a management tool.
- Quality Control (QC) – The operational techniques and activities that are used to ensure that a product or service fulfills requirements for quality. Generally, QC refers to the professional preparation and checking of design documents, inspecting, measuring, and testing a process or product to determine that it meets specifications and the documentation of that activity. Products include design documents, manufactured equipment, or constructed items.
  - QC is a production tool.

2.11.1 Management Policy Statement

CRC is striving to plan and construct the project with the highest regard for quality. Management will identify quality objectives, specify quality-related activities to achieve those objectives, and assign responsibilities for implementing those activities during Final Design.

The entire team, in providing management, design, construction, consulting, or other services, is responsible for producing quality results appropriate for their respective roles. The quality of the transit system is the ultimate measure by which the riders and observers will make their judgment. Therefore, every participant should faithfully implement procedures and follow the QA/QC policies.

2.11.2 Quality Assurance Program

The objective of the quality assurance program is to provide a planned and systematic approach to ensure that contracted products and services are produced and delivered as specified, and the expected level of quality is achieved. The overall requirements of the quality assurance program are established in the quality policy statements, as provided here. Implementation of the quality policy statements is fully described in TriMet's Capital Projects and Facilities Division Quality Assurance Program Manual (QAPM) as well as the Columbia River Crossing Quality Assurance Manual. These manuals provide guidance for the implementation of QA/QC policies during design, equipment procurement, manufacturing, installation, construction, and testing and start-up. Best practices will be utilized from TriMet, C-TRAN, ODOT, and WSDOT, as appropriate.

The objective of the quality assurance program is to provide a planned and systematic approach to ensure that contracted products and services are produced and delivered as specified, and the expected level of quality is achieved.

2.11.3 Program Implementation

WSDOT, ODOT, C-TRAN, and TriMet's requirements for safety, reliability, efficiency, and cost effectiveness in developing the project demand that systematic, consistent, and authoritative controls, including quality-related controls, be planned and implemented at the start of PE. These controls will facilitate early identification of conditions that might adversely affect satisfactory completion of the project, and allow for timely corrective action to minimize repetition of problems. The CRC QAPM establishes policies behind those quality-related controls and provides for procedures to implement the controls. Criteria for developing these quality-related controls include sound engineering design, effective procurement and contracting procedures, and proper manufacturing, construction, installation, and testing and start-up activities.

Controls necessary for preserving the integrity of quality-related activities and the required documentation of the results, are categorized into the following general areas:

- Review of design, contract, and procurement documents, as well as inspection, testing, and start-up procedures, to verify that quality aspects have been considered.
- Review and approval of the Contractor's quality control program to verify acknowledgement and adherence to the design, procurement, and contract requirements.
- Surveillance and monitoring of manufacturing, installation, construction, inspection, and testing and start-up activities to verify adherence to design, contract, and procurement requirements.
- Audits of the Contractor's quality control activities, and quality assurance of their subcontractors' quality control activities, to ensure compliance with procedures and documentation of the activities.

2.11.4 Quality Policy Statements

The following Quality Policy Statements were prepared based upon the FTA Quality Assurance and Quality Control Guidelines and include the 15 elements of a quality program suggested by the FTA Guidelines. TriMet's Quality Assurance Program Manual includes more detailed requirements and guidelines for implementation of the quality policies.

2.11.4.1 Management Responsibility

CRC management is ultimately responsible for the project's quality assurance program. Designated individuals will be responsible for administration of quality assurance and quality control. Duties, authority, and reporting chain of command will be clearly delineated. Consultant and contractor organizations involved in the project are responsible for the quality of all work under their control and for conformance to the quality policies outlined in this document. The Assistant Deputy Project Director will have responsibility for monitoring and auditing of the QA/QC activities.

2.11.4.2 Quality Assurance Program and Documentation

The quality assurance program will extend to all aspects of design, equipment procurement, manufacture, installation, construction, and testing and start-up operations. Written procedures applicable to quality-related activities will be prepared in the form of the QAPM, which will include provisions for such activities as design review, document control, control of materials, inspection and testing of work products, documentation of activities, maintenance of records, and auditing the program.

2.11.4.3 Design Control

Design consultants will be required to submit a QC Plan, identifying the interfaces between different design groups and design disciplines; and should identify the responsibilities for both design performance and for quality assurance. Quality-related design activity will be controlled in accordance with the plan. Applicable criteria, codes, standards, and regulatory requirements will be identified. Designs will be checked for adequacy and verified by an independent design review, as applicable. Design documents will specify appropriate quality standards for materials and workmanship. Design change will be subject to the same quality control measures applied to the original design.

2.11.4.4 Document Control

Document Control, as described here, includes ensuring that work products have the appropriate reviews by appropriate personnel and that they are handled in a way that maintains their integrity until they are placed into the official project files as discussed in Section 2.2.5. CRC management in coordination with WSDOT, ODOT, TriMet, and C-TRAN will establish procedures for control of documents and data to ensure that relevant documents are current and available. Quality control measures will be established to verify that procedures are being followed. Document control must be closely coordinated with configuration management. Contractors will be required to submit a QC Plan describing their plans for this contract requirement.

2.11.4.5 Purchasing, Equipment Procurement, and Construction

Requirements for quality control in purchasing, equipment procurement, and construction apply to all material suppliers, installers, equipment manufacturers, and construction contractors. Contract documents or purchasing specifications will contain relevant criteria, standards, drawings, process requirements, inspection, and testing procedures. The level of quality requirements specified will depend upon the nature and complexity of the work or product. Contractors will be required to submit a QC Plan describing their plans for this contract requirement.

2.11.4.6 Control of Materials, Product Identification, and Traceability

WSDOT and ODOT, with coordination with TriMet and C-TRAN, will establish procedures for control, identification, and traceability applying to all materials, parts, components, equipment, and products, including partially fabricated or assembled components. Physical identification and control will be used to the most reasonable extent possible. Where physical identification is impractical, other appropriate means, such as physical separation of products will be used. Contractors will be required to submit a QC Plan describing their plans for this contract requirement.

2.11.4.7 Control of Special Processes

Special processes required in fabrication, production, or installation that cannot be verified by subsequent inspection would be performed under controlled conditions. Contractors and suppliers are required to submit QC plans which describe their means to control special processes, including written procedures, instructions, drawings, checklists, or other appropriate documents. The plan shall adhere to applicable codes, standards, criteria, and design documents. Special processes include, but are not limited to, welding, soldering, heat treatment, cleaning, plating, nondestructive examination, and testing. Contractors will be required to submit a QC Plan describing their plans for this contract requirement.

2.11.4.8 Inspection and Testing Procedures

Requirements for inspection and testing procedures will be contained in contract or procurement documents. Performance of inspection and testing will be in accordance with established procedures and instructions, as provided by the approved contractors QC Plan. Qualified personnel who are independent of those performing the work will perform inspection and test activities. Appropriate stages of inspection and testing shall be utilized, such as receipt inspection, first article inspection, in-process inspection, installation inspection, and final acceptance inspections. Contractors will be required to submit a QC Plan describing their plans for this contract requirement.

2.11.4.9 Inspection, Measuring, and Testing Equipment

Inspection, measuring, and testing equipment used in the work will be identified, calibrated, and maintained in proper working order and documented by the Contractor. Such equipment must meet the standards of accuracy for the measurements required. Equipment will be calibrated according to national standards when applicable or to documented standards when national standards do not exist. Provisions will be made for periodic recalibration. TriMet, C-TRAN, WSDOT, and ODOT quality assurance personnel will review records of the equipment calibration and maintenance. If inspection, measuring, and testing equipment is found to be out of calibration, the validity of previous inspection and testing results will be re-evaluated for acceptability. Contractors will be required to submit a QC Plan describing their plans for this contract requirement.

2.11.4.10 Inspection and Test Status

Procedures will be established for identifying the inspection and test status of work during production and installation to ensure that only work which has passed inspections and tests is incorporated into the project. The status will indicate conformance or nonconformance with regard to inspections and tests. Test and inspection status will be identified by means of markings, tags, labels, routing cards, inspection and test records, physical location, or other suitable means. Contractors will be required to submit a QC Plan describing their plans for this contract requirement.

2.11.4.11 Nonconformance

Procedures will be established and maintained to control nonconforming work to assure that such work is not used or installed and potential adverse impacts are controlled. Responsibility and authority for the disposition of nonconforming work will be defined in the procedures. The final disposition of nonconforming work will require WSDOT, ODOT, TriMet and/or C-TRAN approval dependent upon the material, and may include rework, acceptance for an alternative application, or rejection. Reworked or repaired work will be re-inspected and/or tested in accordance with contract requirements. Contractors will be required to submit a QC Plan describing their plans for this contract requirement.

2.11.4.12 Corrective Action

Corrective action procedures will be established including:

- Investigating the cause of repetitive nonconforming work or product
- Analyzing processes to detect and eliminate potential causes of nonconforming work or product
- Initiating preventative measures to correct problems appropriate to the level of risk
- Ensuring that corrective actions are implemented and effective
- Implementing and recording changes in procedures resulting from corrective actions

2.11.4.13 Quality Records

All staff performing QA/QC activities will be responsible for maintaining records. These records will be prepared, compiled, and stored in a retrievable manner. Attention will be given to accuracy, completeness, legibility, final disposition, and security. Typical quality records may include design reviews, field or shop inspection reports, performance test data, qualification reports, validation reports, material delivery reports, calibration data, certifications, daily inspectors' reports, and audit reports. Contractors will be required to submit a QC Plan describing their plans for this contract requirement.

2.11.4.14 Quality Audits

A program for planned periodic audits will be established to ensure that each aspect of the QC Plans has been developed, implemented, and documented, in accordance with specified requirements. Audit findings should be reviewed with the personnel having responsibility in the area being audited. WSDOT, ODOT, TriMet, and C-TRAN QA/QC personnel, including that of the contractors (as appropriate), will have responsibility for their respective audit programs.

2.11.4.15 Training

WSDOT, ODOT, C-TRAN, and TriMet personnel performing quality-related activities will be technically qualified for their task and familiar with the QA/QC procedures. TriMet will implement a professional training program with appropriate programs and documentation. Contractors will be required to submit a QC Plan describing their plans for this contract requirement.

2.11.5 Quality Assurance and Quality Control Responsibilities

The CRC Quality Assurance Leads and Managers (see CRC Organizational Chart), CRC RE and inspectors, and the contractor responsibilities related to the 15 Quality Policy elements will be described in further detail in the QAPM prepared during Final Design. Further detail as to RE responsibility is included in an RE Manual. In-depth detail for the contractor responsibilities will be included in their approved QC Plan.

2.11.6 Design Quality Control

Quality control of design activities applies to the activities of defining, performing, controlling, and verifying designs, including but not limited to, design of facilities, structures, systems, and equipment. Design consultants will submit a Design QC Plan which includes the following, as appropriate:

- Basis of Design
  - The design basis should include the scope, criteria, applicable codes and standards, and regulatory requirements.
- Design Interfaces
  - The interfaces between different design groups and design disciplines should be identified, as well as the responsibilities for both design performance and for quality assurance.
- Design Review
  - Qualified personnel, other than those who originated the design, will review documents at appropriate stages. Design review will include such aspects as verification of the basis of design, an independent check of calculations, and a review of constructability. Design changes or revisions will be subjected to the same level of checking, review, and approval as the original design.
- Document Control
  - Design documents should be uniquely identified and controlled to assure the use of approved documents.
- Audits
  - Design consultants should provide for internal audit of their QC plan, as well as for audits of their design subcontractors.
- Documentation
  - Quality-related activities performed by the designers will be documented and records maintained.

The TriMet Quality Assurance and Quality Control Plan – Design may be used as a guideline, in conjunction with the quality assurance program, by the design consultants to develop a Design Quality Control Plan for submittal to CRC.

2.11.7 Construction Quality Control

Requirements will be established for quality control of construction activities. An RE and inspection staff will be assigned to each construction contract to provide on-site quality inspections and oversight of the Contractor's QC Plan. The RE is responsible for final disposition of the Contractor's QC Plan. The Assistant Deputy Project Director will provide comments regarding the Contractor's proposed QC Plan and personnel to the RE.

2.11.7.1 Inspection and Test Plans

Contractors will be responsible for the quality of all work performed by their own employees, manufacturers, subcontractors, or suppliers. Inspection and testing requirements for construction will be included in contract specifications. Requirements will include the type of tests, frequency of tests, who is to perform the tests, and the documentation required. Based on the specification requirements, the contractor shall develop an Inspection and Testing Plan, which will clearly delineate all inspection and testing activities required by the contract.

2.11.7.2 In-Process Inspections

REs and inspectors will be deployed to ensure that construction QC procedures are in place and effective, ensuring that quality standards are acceptable. The RE and inspector activities will include:

- Verifying the contractor's material certifications and samples.
- Inspecting materials and equipment delivered to the job site(s).
- Performing inspections of specialty equipment and fabricated construction materials.
- Participating in First Article Inspections (FAIs), or witness and hold point activities, as delineated in the Contract specifications and established in the contractors approved QC Plan.
- Inspecting construction and installation work in progress.
- Documenting the results of inspections and tests, and specifically noting any failed tests, retesting, or re-certification required.
- Monitoring construction operations and field-testing of construction material.
- Reviewing the QC documentation of the contractor.

WSDOT, ODOT, C-TRAN, or TriMet may assign a full time on-site inspector to the vehicle manufacturing facility to ensure ongoing compliance with the CQ Plan. The TriMet QA Manager will also perform audits and surveillances of the manufacturer's facilities on an as-needed basis.

2.11.8 Materials Testing Program

Contract specifications contain standards for materials and corresponding tests to assure compliance with contract requirements. Qualified personnel will accomplish materials testing during construction in accordance with approved testing practices and procedures, as outlined in Chapter 9 of WSDOT Construction Manual (M 41-01.06). Requirements for materials are described in Section 1-06 and Division 9 of the WSDOT Standard Specifications for Road, Bridge, and Municipal Construction (M 41-10).

In addition, the CRC Project will also draw on TriMet's material testing program on multiple light rail projects. Generally, the Contractor shall have primary responsibility for testing of materials. The Contractor is to prepare and submit a QC Plan that includes a testing plan, containing a listing of tests that references each Specification Section required by the contract. It is anticipated that the Contractor will obtain the services of an independent materials testing laboratory to actually perform the quality control tests. Laboratory qualifications shall also be submitted as part of the QC Plan.

In addition to CRC, WSDOT, and TriMet staff, CRC may contract with a separate independent materials testing laboratory to perform quality assurance confidence tests to verify that the Contractor's QC testing is satisfactory. The RE, the Inspector, or the QA Manager will direct quality assurance confidence testing.

Results of tests, including Contractor quality control tests and quality assurance confidence tests, will be submitted to the RE. Responsible design and construction staff will review results of tests. The RE's office will maintain test reports and direct any actions to be taken for non-conforming items.

3. Management/Implementation of LRT

3.1 Introduction

3.1.1 Overview

This section describes the management and implementing strategies specific to the transit elements of CRC. FTA, WSDOT, TriMet, C-TRAN, and other partners have specific needs for project development, delivery, operations, and maintenance of proposed facilities. Resource staff from WSDOT, TriMet, C-TRAN, and other partners are necessary for successful project delivery and future operation of the proposed facilities. Considerations for maintenance and operations funding are different than those for a highway program. This section delineates Transit specific management planning and design. Additional detail regarding construction, maintenance, and operations will be better defined as strategies are developed in the preliminary and final design phases.

3.1.2 Project Description Summary

The DEIS evaluated project alternatives before agreement on the LPA. The LPA calls to extend LRT from its current terminus at the Expo Center in Portland, Oregon, to Clark College in Vancouver, Washington. Additional detail for the LRT project description can be found in Section 1.2.2.

3.1.3 Policy and Governing Board

WSDOT, the grantee, will follow the procedures outlined in the appropriate design, environmental, and construction related procedures already established statewide.

For any contracts administered by TriMet, the TriMet Board of Directors, composed of seven volunteer members appointed by the Governor of Oregon, sets policy and provides overall direction for the General Manager. The Board of Directors meets at least monthly as a public governing body. All meetings, except executive sessions, are held as public forums.

3.2 Organization and Staffing

3.2.1 LRT Engineering and Organization Summary

LRT design and construction will happen within the overall structure of the CRC organization. The organizational chart for the project is shown in Chapter 2. The CRC Project Director reports to the WSDOT Regional Administrator and in turn to the Washington State Secretary of Transportation who has ultimate responsibility for construction of the transit portion of the project as the head of the agency designated as the FTA grantee, but has delegated some responsibilities to the Project Director related to New Starts and FTA coordination. For the overall CRC project, the Project Director represents the interests of both WSDOT and ODOT and work with the Executive Management Group made up of senior executives from both WSDOT and ODOT to ensure the needs of both agencies are met.

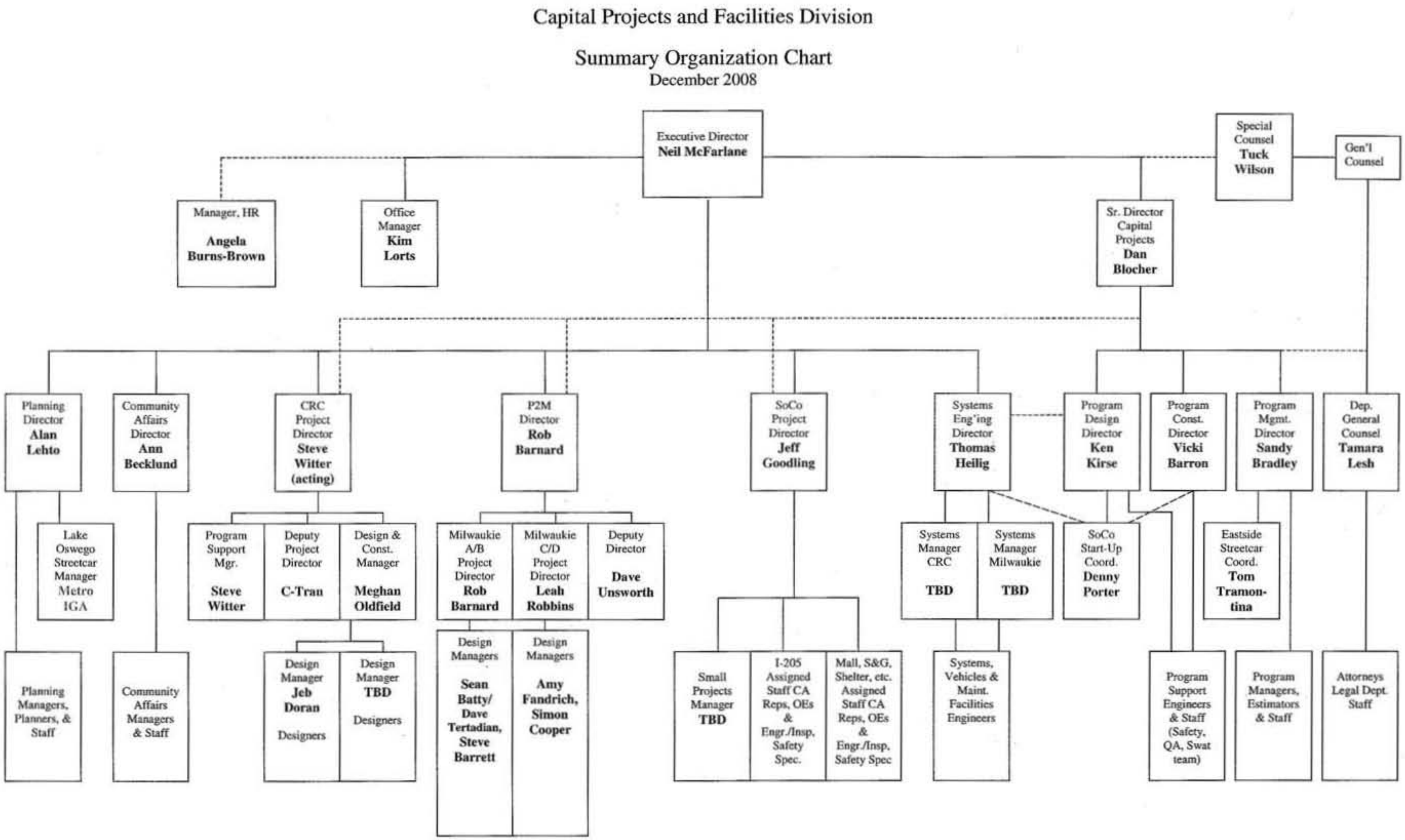
The CRC project will especially rely on TriMet experience and staff to implement the LRT portion of the project. Key TriMet staff are embedded in the CRC project and work in the co-located office. Other expertise will be drawn upon from TriMet staff as needed. Because of the size and specialized nature of the LRT, this section includes a full description of TriMet's organization. TriMet is organized in six divisions:

- Office of the General Manager
- Communications and Technology
- Finance and Administration
- Operations
- Capital Projects and Facilities
- General Counsel/Human Resources

An executive director manages each division and reports to the General Manager. Figures 3-1 and 3-2 are organizational charts for TriMet detailing the aforementioned divisions and personnel.

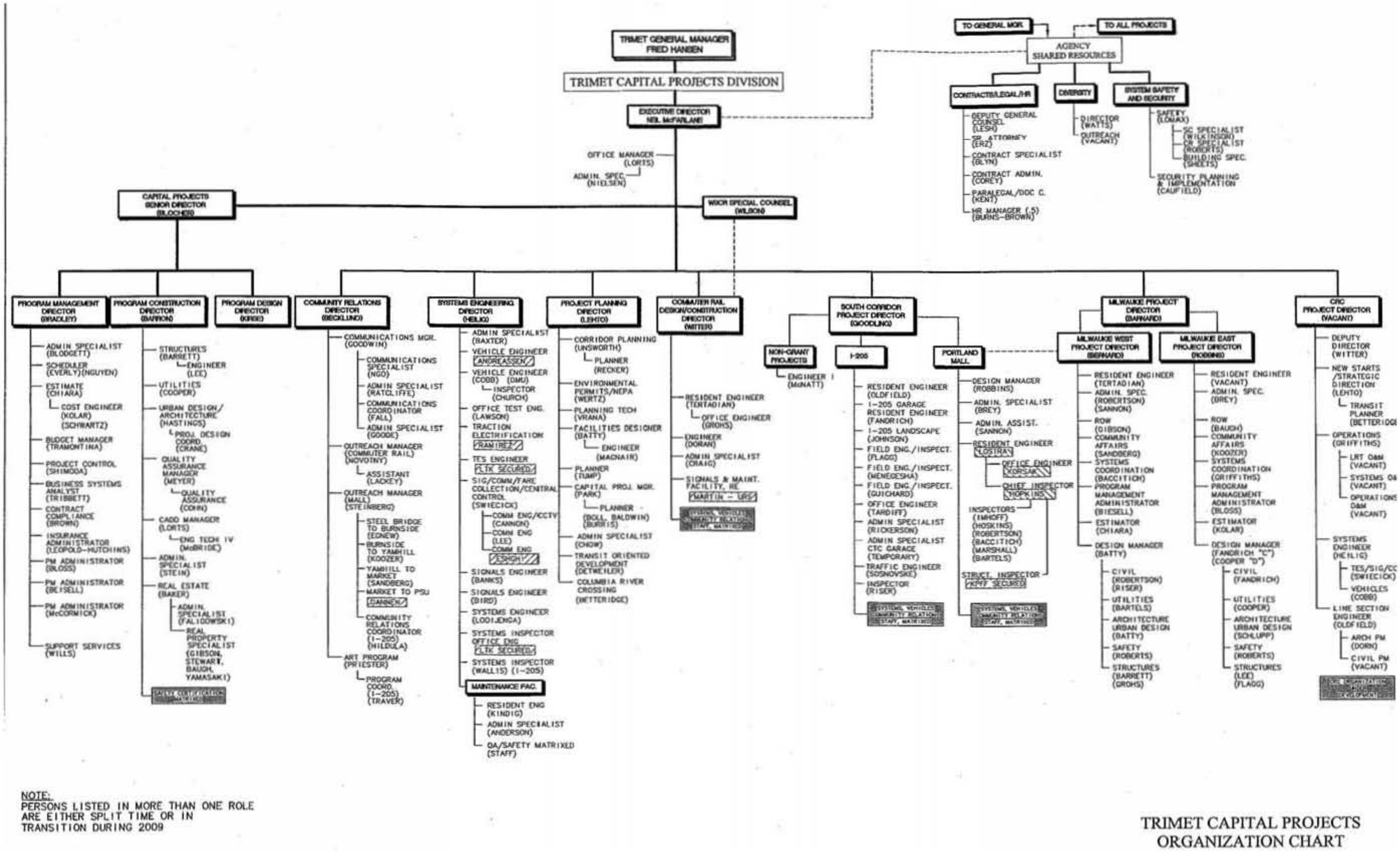
Figures 3-3 through 3-8 detail C-TRAN's organization. Roles and Responsibilities for C-TRAN personnel will be provided in the next version of this plan.

Figure 3-1. TriMet Summary Organization Chart



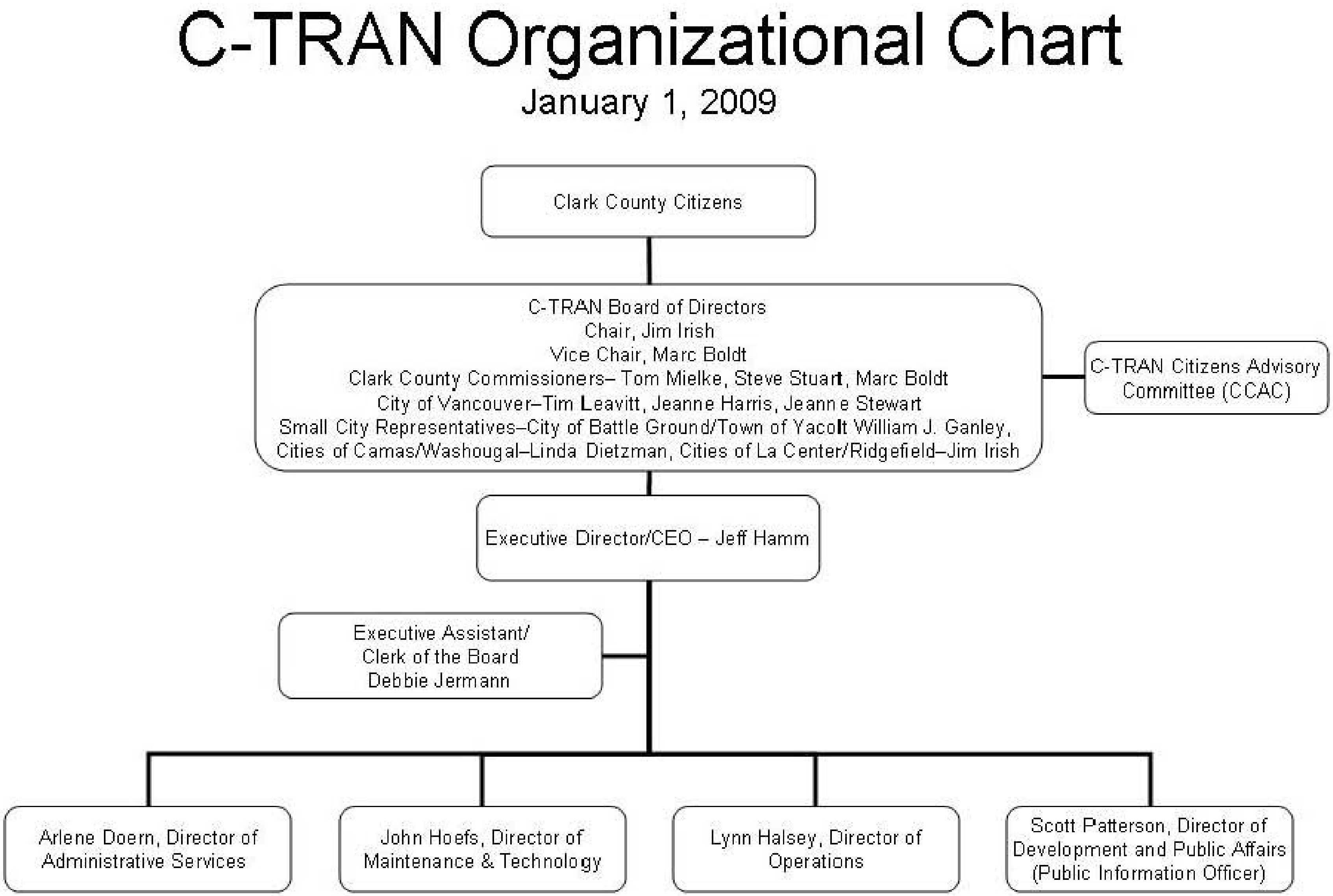
This page left blank intentionally.

Figure 3-2. TriMet Capital Projects Organization Chart



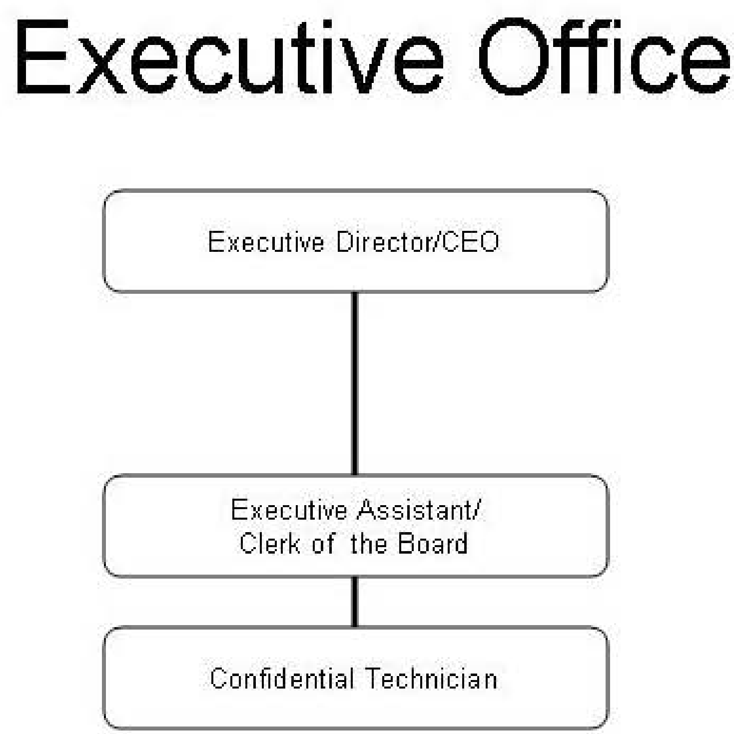
This page left blank intentionally.

Figure 3-3. C-TRAN Organization Chart



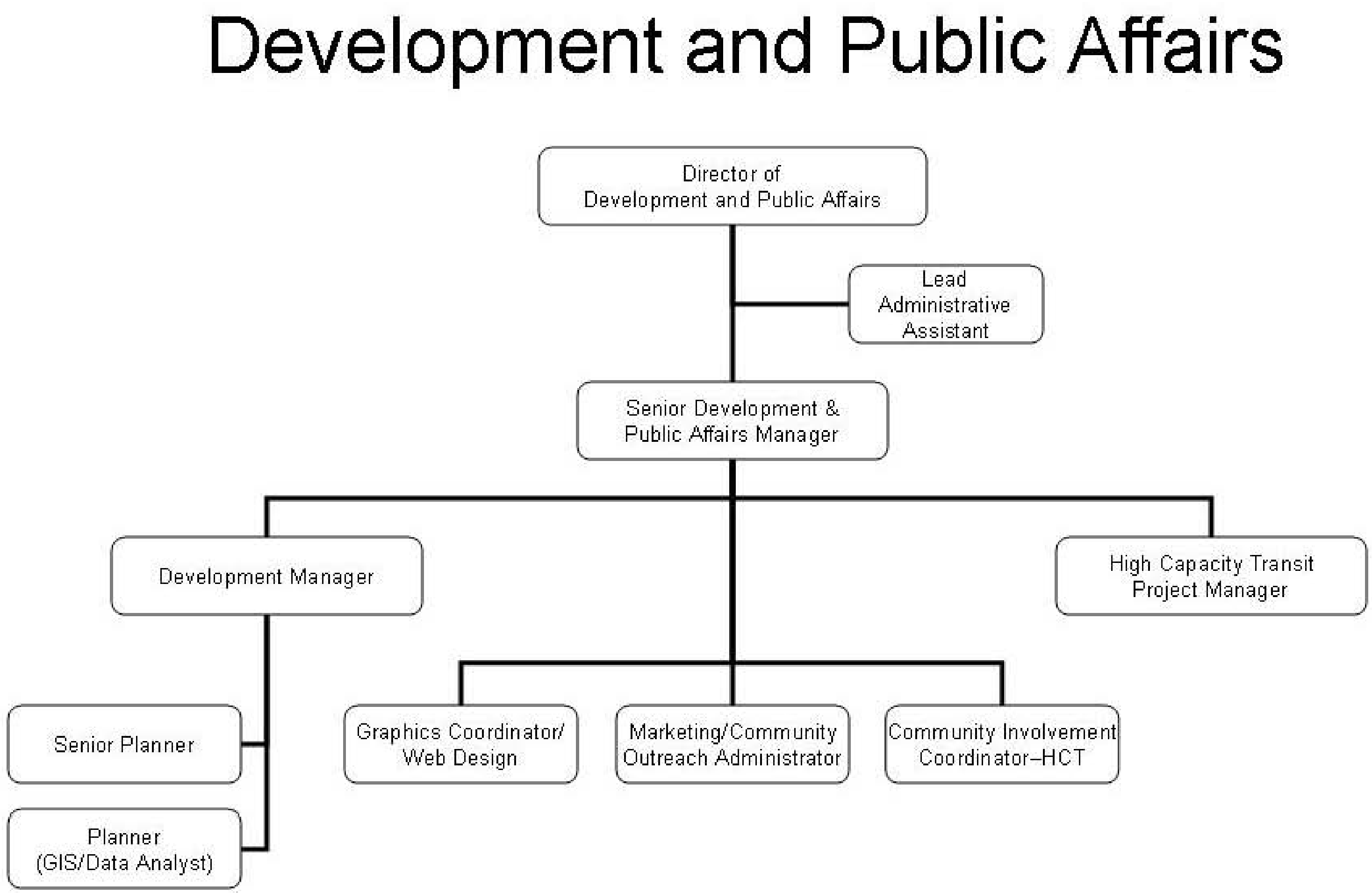
This page left blank intentionally.

Figure 3-4. C-TRAN Organization Chart – Executive Office



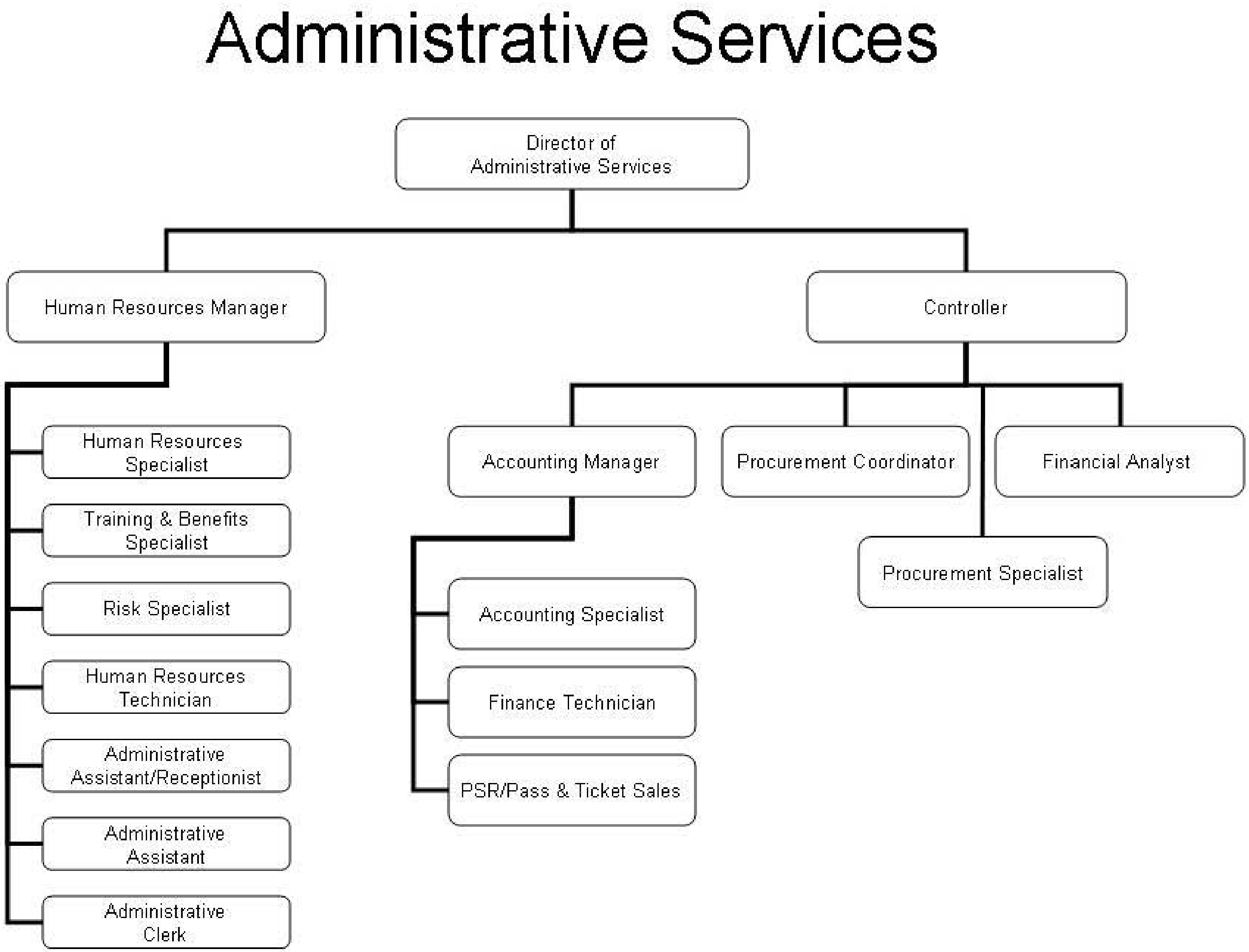
This page left blank intentionally.

Figure 3-5. C-TRAN Organization Chart – Development and Public Affairs



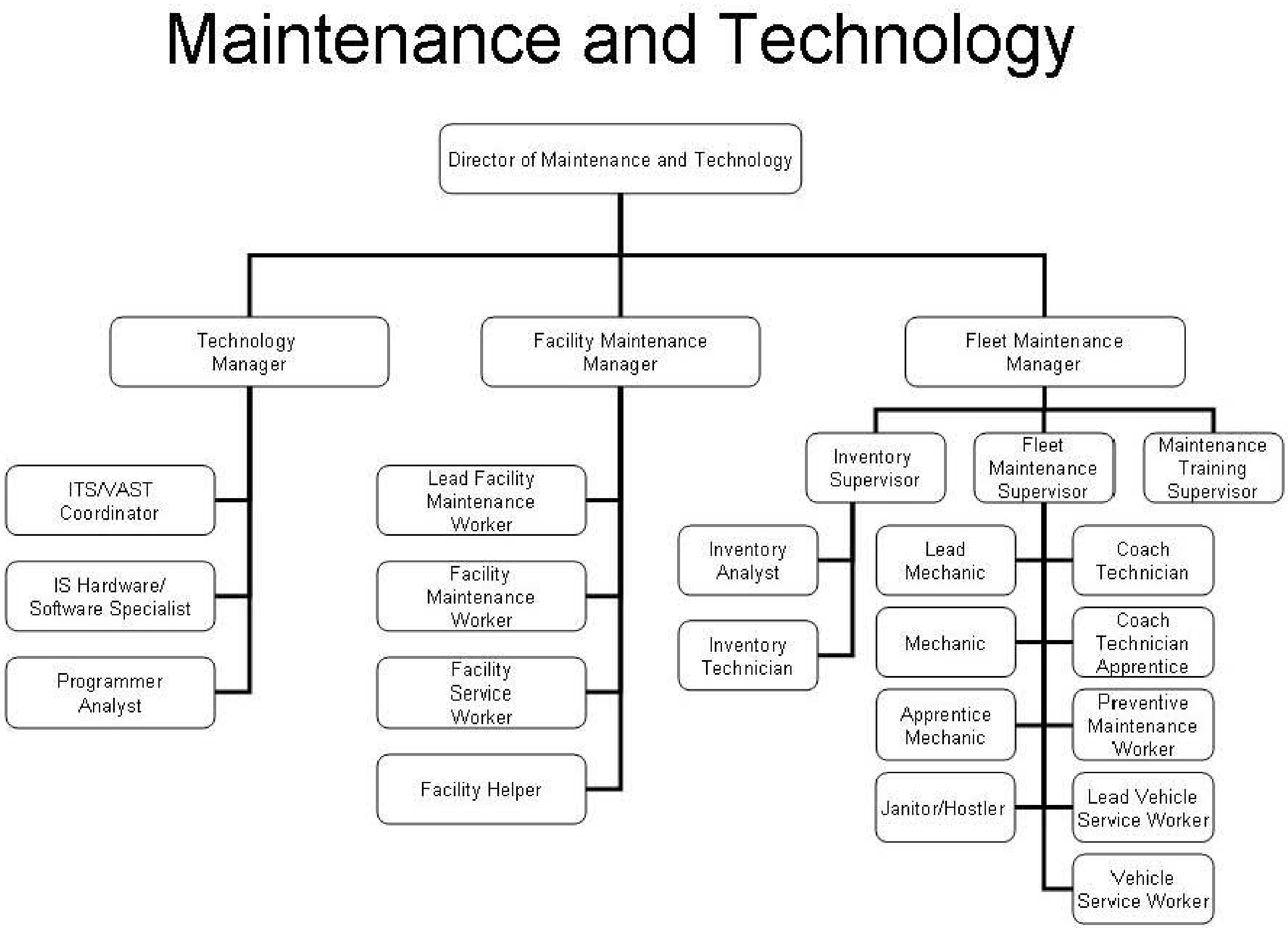
This page left blank intentionally.

Figure 3-6. C-TRAN Organization Chart – Administrative Services



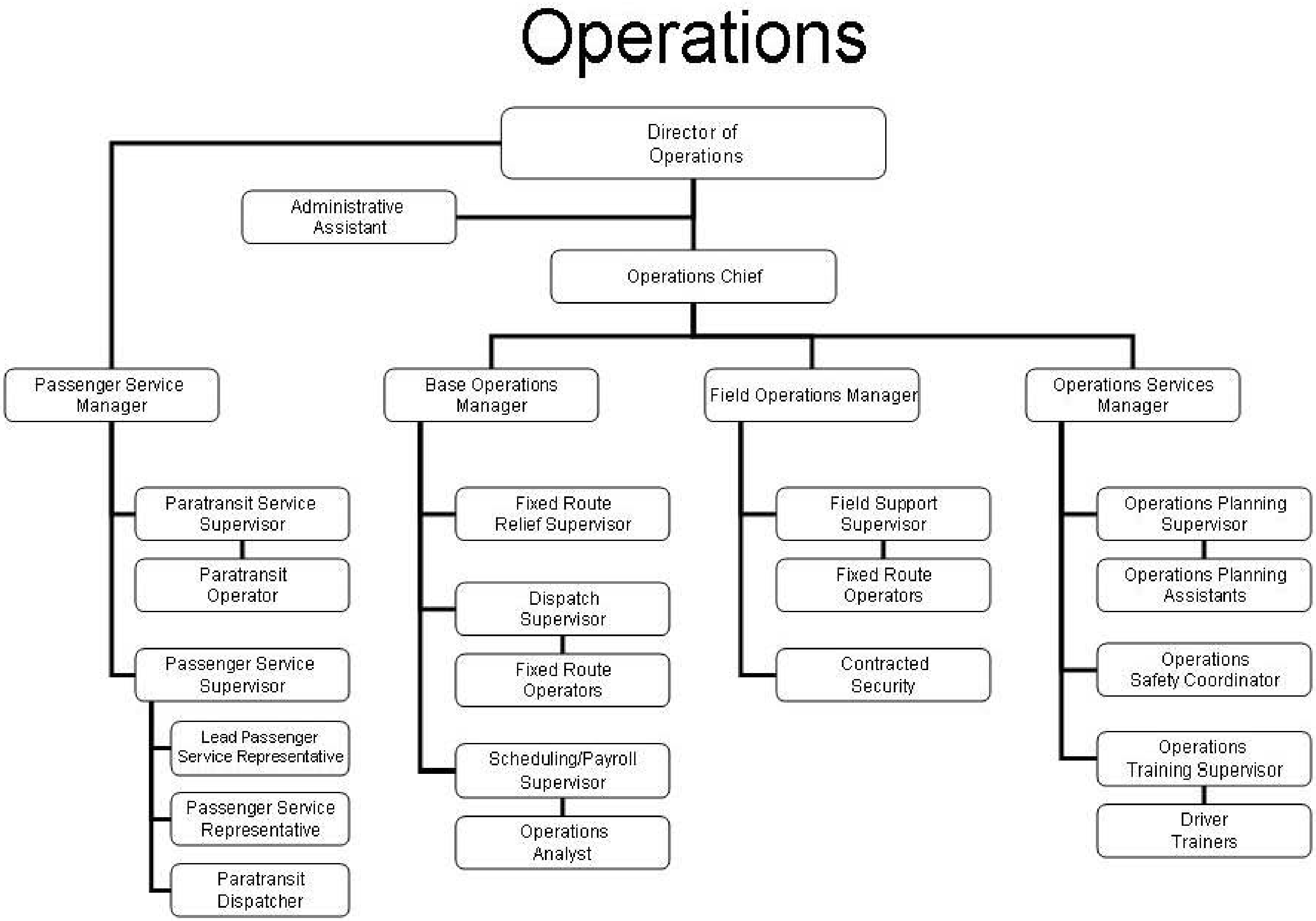
This page left blank intentionally.

Figure 3-7. C-TRAN Organization Chart – Maintenance and Technology



This page left blank intentionally.

Figure 3-8. C-TRAN Organization Chart – Operations



This page left blank intentionally.

Responsibility for design and construction of the LRT resides in the CRC office under the lead of WSDOT, the grantee. The Executive Director of TriMet, Capital Projects and Facilities Division, is responsible for the successful planning, design, and construction of LRT for TriMet.

Reporting to the Executive Director of Capital Projects is:

- Capital Construction Programs Director
- Program Management Director
- Project Delivery/Engineering Support Director
- Milwaukie West Segment Project Director
- Milwaukie East Segment Project Director
- Systems Engineering Director
- Project Planning Director
- Community Relations Director
- Facilities Maintenance Director
- Columbia River Crossing Transit Manager
- Commuter Rail Project Director
- Mall Project Director
- I-205 Project Director

TriMet is concurrently managing four rail projects, two nearing completion (WES Commuter Rail and South Corridor – Green Line MAX) and two preparing to enter into Preliminary Engineering (CRC, Portland to Milwaukie Light Rail). TriMet has created a matrix organization that allows for the sharing of resources under a consistent management philosophy. The use of internal agency specialists in part-time support of the CRC is referred to as a “matrix” staffing approach. It facilitates leveraging of existing, unique system knowledge while minimizing project positions.

This matrix extends into the CRC project, allowing staff under the Executive Director of Capital Projects to work embedded in the CRC project management structure.

The Commuter Rail Project opened for revenue service February 1, 2009. The South Corridor Light Rail Project will opened for revenue service in September 2009. Personnel for Commuter Rail and the South Corridor transition into roles for the CRC and Portland to Milwaukie Light Rail as current projects are completed. For the CRC, the Portland-Milwaukie Line Section Project Directors, Commuter Rail, Mall and I-205 Project Directors, and the Facilities Maintenance Director are not considered to be key personnel.

The light rail component of CRC relies heavily on integrating C-TRAN's operations to form a complete transit network in Vancouver, Washington. As with TriMet, key C-TRAN personnel are embedded within the CRC project organization and work in the co-located office to aid in the transit development. A C-TRAN staff member is the Deputy Transit Manager involved in day-to-day project activities. An additional C-TRAN staff member is embedded in the communications team. The Deputy Transit Manager, with the help of staff and management as needed, will communicate all necessary information to C-TRAN's Executive Director/CEO and Board of Directors for review, and voting when appropriate. The transit team will maintain ongoing interagency coordination to ensure that both C-TRAN and TriMet are aware of project milestones and decision points and are involved in the decision making process.

3.2.1.1 Civil Design and Construction

During PE, WSDOT and TriMet, in consultation with C-TRAN, will study the appropriate contracting approach to manage most of the design and construction. Dividing the project into segments would allow for separate design managers, and REs to focus on segments.

- Reporting to TriMet's REs will be the Office Engineers and inspection staff and the respective contractor(s).
- The Design Managers will manage the consultant design contract(s) and coordinate Design Services During Construction (DSDC) for the civil/track work elements.
- The Urban Design/Architecture Manager will coordinate urban design planning, specific station treatments, and other overall architectural design issues.
- The Urban Design/Architecture Manager reports to the Project Delivery – Design Director and the REs and the Design Managers report to the respective Project (Design/Construction) Director.

WSDOT and TriMet, in consultation with C-TRAN, will finalize the approach to contract implementation for each line section during PE.

3.2.1.2 Systems Design and Construction

The Systems Engineering Director will be responsible for the overall coordination of all systems contracts (including vehicles), regardless of their location. Also, the Systems Engineering Director will manage the systems engineering consultant contract(s). Reporting to the Systems Engineering Director will be engineers with direct responsibility for LRVs, traction electrification, communications, signals, fare collection, expansion of existing facilities, and central control systems.

3.2.1.3 Additional Engineering Resources

Shared resources include engineers and technical staff with specialties in structural, landscaping, Americans with Disabilities, traffic, utilities, real estate acquisition, quality assurance, construction safety, and Computer-Aided Design and Drafting (CADD) disciplines. These resources are arrayed via matrix across all projects and report to the Project Delivery Directors.

3.2.2 Key Personnel

The following proven and successful approach from TriMet will be incorporated and coordinated as needed in the CRC project. Director-level and other selected manager-level TriMet job descriptions for involved staff are summarized below. Job descriptions for each of the following positions are on file with the TriMet's Human Resources Department. Resumes are included in the attachments.

- Executive Director, Capital Projects and Facilities Division
  - Has final responsibility for the LRT project and prioritizes and obligates TriMet resources.
  - Represents TriMet to outside agencies and interests including federal, state, and local governments.
  - Serves as a TriMet representative on partnering groups.
  - Reports to the General Manager.
- Capital Construction Programs Director
  - Within TriMet has primary responsibility for the LRT work.
  - Prioritizes and obligates TriMet resources, may represent the Agency to outside agencies and interests.
  - Has executive level role in negotiations/dispute resolution with contractors.
  - Reports to the Executive Director, Capital Projects and Facilities Division.
- Program Management Director
  - Directs the performance of TriMet staff that have responsibility with schedule; budget; grant administration; risk management; cost control, monitoring and reporting; change control, contract compliance, insurance, and claims administration.
  - Monitors Affirmative Action/Equal Employment Opportunity (AA/EEO) compliance, DBE compliance, and contract closeout.
  - Reports to the Executive Director, Capital Projects and Facilities Division.
- Project Delivery/Engineering Support Director
  - Directs TriMet staff supporting all projects with engineering resources.
  - Coordinates with Systems Engineering Director, Operations Division and Safety and Security Director for safety certification, test and startup.
  - Directs real estate support functions, including right-of-way.
  - Responsible for coordination with PMOC.
  - Reports to the Executive Director, Capital Projects and Facilities Division.

- Segment Project Directors
  - Has primary responsibility for all contracts that make up each line section, including all civil and systems construction contracts, among others.
  - Manages staff responsible for administration of all design and construction contracts.
  - Responsible for internal/external communications regarding project issues, and coordination with third parties.
  - Monitors and reports cost and schedule status, change control, and claims administration.
  - Has top management level role in negotiations/dispute resolution with contractors.
  - Reports to the Executive Director, Capital Projects and Facilities Division.
- Systems Engineering Director
  - Manages vehicle, traction electrification, signals, and communications engineers during the design phase.
  - Manages the day-to-day work of the consulting contract for systems engineering and communications design, including adherence to contract requirements and task/budgetary guidelines.
  - Reports to the Executive Director, Capital Projects and Facilities Division.
- Project Planning Director
  - Directs project planning activities including environmental work, intergovernmental agreements, station area development, and joint development planning.
  - Coordinates with Bus Operations on matters of construction re-routes and revenue operations feeder networks.
  - Reports to the Executive Director, Capital Projects and Facilities Division.
- Community Relations Director
  - Directs the community relations effort focused on residents, businesses, and neighborhoods along the alignment.
  - Manages public art program.
  - Coordinates with CRC central management.
  - Reports to the Executive Director, Capital Projects and Facilities Division.
- Deputy General Counsel
  - Directs all TriMet legal matters related to LRT including selection and hiring of outside counsel, contracts support, intergovernmental agreements, claims, major change orders, guidance on accepted application of federal and state laws and regulations.
  - Assists in implementation of the Disadvantaged Business Enterprise program.

  - Provides oversight of matters requiring Board of Directors approval.
  - Reports to TriMet's General Counsel.
- Quality Assurance Manager
  - Responsible for development, implementation, and compliance of TriMet's QA/QC Programs for design and construction including conformance to all FTA quality requirements, performance audits.
  - Reports to the Project Delivery Directors for routine matters, but has a direct line to the Executive Director, Capital Projects and Facilities Division.
- Environmental Permits/NEPA Coordinator
  - Assures TriMet compliance with federal, state, and local environmental regulations related to protection of the natural and cultural resources area, including permits from federal, state, and local agencies.
  - Maintains the Mitigation Measures matrix and manages the environmental mitigation measures required by the FEIS.
  - Reports to the Planning Director.
- Civil Engineering Design Managers
  - Responsible for management of overall design effort throughout design and construction of the project including scope, schedule, and budget of consultant design contracts.
  - Manage consultant contracts for preliminary and final design, as applicable.
  - Coordinate with CADD Manager to ensure accuracy of electronic drawing files and specifications.
  - Report to respective Project Design/Construction Director.
- Program Scheduling Engineer
  - Manages master and detailed schedules.
  - Analyzes contractor schedules; requests clarification. Identifies potential delays; monitors recovery progress.
  - Reports to Program Management Director.
- Estimating Administrator
  - Manages estimators assigned to field offices.
  - Reviews contractor requests for changes.
  - Prepares fair cost estimates.
  - Reports to Program Management Director.

- Real Estate Manager
  - Oversees appraisal and acquisition staff and activities.
  - Represents TriMet in court proceedings as required.
  - Reports to Project Delivery/Engineering Support Director.
- CADD Manager
  - Manages electronic drawing files including collection, storage, organization, and retrieval of consultant-prepared drawing files as well as maintaining drawing management database and drawing management software.
  - Issues drawing files to consultants, REs, and others for use in post-award evaluations, mark-ups, and drawing changes.
  - Manages and performs drawing file notations of as-built data collected during construction by the staff and the contractor.
  - Reports to Project Delivery/Engineering Support Director.
- Program Scheduling Engineer
  - Manages schedule.
  - Reports to Program Management Director.
- Resident Engineers
  - Each major civil and systems contract will be managed by an RE. The appropriate engineering specialist will function as the RE for each system contract (i.e., vehicles; signals, communications, closed circuit television; traction electrification, etc.).
  - During PE, the REs will identify, explore, and refine alternatives and related impacts, including cost estimates. Generally they will lay the foundation for establishing schedule, budget, and safety plans.
  - During the design phase, the RE is expected to participate in developing specifications and special provisions for civil contracts and commercial provisions for systems contracts; respond to questions during the bid or proposal period; conduct and participate in pre-bid or pre-proposal meetings, if applicable; and participate in evaluating bids or proposals.
  - During the construction phase, the RE has the authority and responsibility for enforcing contract provisions. Specifically, the RE has the authority to:
    - Stop any work whenever such action is deemed necessary.
    - Reject materials or workmanship that does not conform to contract requirements.
    - Direct unacceptable work to be removed and replaced with acceptable work.
    - Respond to contractor’s request for information.
    - Negotiate change orders within the delegated limits of authority.

    - Communicate with appropriate TriMet maintenance and operations departments.
  - During final design, TriMet will determine how construction inspection responsibilities will be filled. TriMet typically hires inspectors who report to the REs.

- Business Systems Analyst
  - Manages computer-based business systems including design, development, and administration of project management, document control, and community relations software.
  - Collaborates with TriMet Information Technology Department oversight.
  - Reports to Program Management Director.

3.2.3 Agency Organization During Design

CRC recognizes the size, importance, and multi-jurisdictional nature of the project. Assisting with the LRT will be groups of professionals within the agency as well as staff from local agencies in both states.

WSDOT may also draw upon other expertise within TriMet, including financial planning, bond issuance, revenue management, risk services, and accounting functions. The Finance Division will also provide assistance in the information technology and procurement functions. Operations planning (with respect to rail maintenance and transportation staffing), scheduling, fare inspection, security and bus service planning will be fulfilled within the Operations Division. Close coordination between operations staff and CRC staff will be required to ensure compatibility and integration with the existing light rail system.

C-TRAN management staff is and will also be embedded in the overall management structure of the CRC project to ensure the project meets the long-term operational needs of C-TRAN.

3.2.4 Use of Consultants

CRC will perform engineering, management, and administrative work with an integrated team composed of staff as well as consultants. Consultants are an extension of staff to provide support in the following circumstances:

- For specialized expertise.
- For short-term staff augmentation to assist staff during peak work periods.
- For long-term services in support of major project elements which can be more efficiently performed by outside services.
- Events and conditions where CRC may benefit from outside perspective and objectivity.
- Smaller consulting contracts for specialized services during various stages.
  - Legal/claims support, environmental, consulting, materials testing, operations planning, real estate acquisition support, computer, support, partnering, safety and security, and public relations, among others.

TriMet and C-TRAN staff from the department responsible for the particular project element will manage consultant contracts under WSDOT fiduciary oversight. For the PE phase, consultant contracts will be managed by the respective Civil Engineering Design Managers, or the Systems Engineering Director, whichever is appropriate. Consultants will also be retained in the following areas:

- Civil Engineering – reports to the segment Civil Engineering Design Manager(s) through the technical lead; provides design services in the areas of civil and structural facilities, trackwork, utilities, architecture, and landscaping. These contracts also include design services during construction.
- Systems Engineering – reports to the Systems Engineering Director; provides design services in the areas of operations facility revisions, electrification system, train signal system, train-to-central control communications system, LRVs, and fare collection system. These contracts also include systems design services during construction.
- Program Management – reports to appropriate Program Management staff. These contracts may include assistance with risk assessment, scheduling, database development, and estimating.
- Construction Management Consulting – reports to the segment Project Directors; provides staff augmentation during the construction phase, including resident engineering, office engineering, and inspection.

Consultant staff may be co-located within the CRC office to optimize communications. Staff managers will be responsible to monitor and verify consultant and sub-consultant charges prior to the approval of invoices, and track expenditures against budget.

3.2.5 Communications

Effective communications among the CRC team will occur through regular management meetings as well as ongoing, day-to-day interaction on a myriad of management functions. For example, this will be especially true for project control items like cash management, invoicing, grant management, and interrelated design issues like the river crossing. Key TriMet and C-TRAN staff will be located in the Vancouver, Washington CRC office to facilitate day-to-day collaboration between all CRC staff, consultants, and various interface points. TriMet and C-TRAN staff co-located at the CRC office are considered an integral part of the overall organizational chart and treated as such in the descriptions in this document.

3.2.5.1 Monthly Reviews

Throughout the CRC's PE, final design, and construction phases, the principal reference for design, procurement, and construction contract information will be the monthly Project Report. This report is assembled and edited by CRC staff, and details current status information for each major contract package. Reported information includes a description of progress, potential changes, safety and quality comments, engineering issues and commercial issues. Summary schedule and cost information and analysis are also included. The report is issued following the project's central accounting close of the previous month's financial activity.

Cost data, summary level budget, expenditure, and cost forecast information is included, as well as detailed data for each major contract package, including budget, expenditures, and change orders.

The principal reference for schedule information is the Master Program Schedule. Schedules for each contract package include the design review submittal dates, final design completion date, advertising date, award date, notice-to-proceed date, contract completion date, and major milestones. Each of these report components will be provided to FTA as well as appropriate project participants. Preparation of reports will be the responsibility of Program Management.

3.3 Design Program

LRT design will be managed for maximum cost effectiveness. Cost effectiveness considerations include: design; construction; operating expense; and energy consumption. The design will also safeguard ideals of public and worker safety, system reliability, service comfort, and ease of maintenance.

3.3.1 Requirements and Standards

A Design Criteria manual will govern design work for LRT. The criteria are updated to reflect lessons learned on previous work as well as industry advances.

Deviations from the Design Criteria may be made in particular situations. The appropriate Design/Construction Director must approve any deviation, before it can be included in the design. The Design Manager will identify, explain, and justify any deviation from the established criteria.

3.3.2 Design Supervision

During Final Design the Line Section (Design/Construction) Directors will manage final design work. Civil Design Managers for each civil consultant design contract will report to the respective Line Section Directors. Design managers for each systems design contract will report to the Systems Engineering Director.

3.3.2.1 Design Management Organization

The Line Section (Design/Construction) Directors are responsible for design management.

3.3.3 Design Coordination

A Technical Advisory Committee (TAC) comprised of stakeholders from C-TRAN, TriMet, ODOT, WSDOT, City of Vancouver, City of Portland, PMOC, FTA, and any other relevant permitting agencies will be established.

TAC meetings will be held on a regular basis depending on project needs. Regular meetings will be used to review status of the “issues list.” At key points in the design process plan sets will be distributed to TAC members and formal comment and review sessions will take place. Formal protocols will be established for settling unresolved issues.

3.3.4 Design Review Process

CRC uses stakeholder groups to orchestrate the timely, informed involvement of all stakeholders. Stakeholders include engineers, CRC team managers (Facilities Management, Project Planning, and Real Property, Safety and Security, etc.), FTA, PMOC, representatives of any end-user groups, local jurisdictions, regulatory agencies, and others who have technical input or coordination interest. Keeping these stakeholders informed, anticipating their needs, listening to their input, and giving prompt and sensitive responses to their questions and concerns are essential to the success of the CRC and to sustained community support.

3.3.5 Operations Review and Input

TriMet will coordinate with C-TRAN and operating, safety, and maintenance staff to review and provide input to the preliminary and final design and implementation process in the following ways:

- Participate in reviews of all designs to determine operability, maintainability, safety, and convenience.
- Participate in the Project's Safety and Security Task Force.
- Review all designs for compatibility of bus-rail passenger transfer facilities.
- Participate in establishing test requirements and provide requirements on test summary sheets for on-site tests (acceptance, systems, and pre-revenue).
- Provide support to on-site acceptance testing as required.
- Allocate operations and maintenance personnel and equipment resources as identified on test summary sheets.
- Actively participate in the planning, test procedure writing, management, and implementation of LRT systems and pre-revenue tests.
- Establish test procedures.

3.3.6 Design Change Orders

When a change in scope for design services is defined and the price for the additional or deleted services is agreed upon, the consultant manager initiates a contract amendment that is administered by the CRC Agreements Engineer. Contract modifications may also involve changes in scope, time, deliverables, etc. without a change in budget. The Project Director also approves every design contract modification to indicate that sufficient funds are available and to identify the funding source. This process is further detailed in Section 2.2.3.7.

3.3.7 System Integration

The purpose of this management function is to ensure compatibility among the various light rail systems. TriMet's Line Section (Design/Construction) Directors will coordinate with C-TRAN ensuring system integration within their contract elements, as they relate to other concurrent or follow-on contracts and with the existing operating systems. The Systems Engineering Director oversees this management function and is responsible for the overall integration effort.

3.3.7.1 Final Design

The design leads work very closely with operations and maintenance representatives to verify that:

- Documents under review fulfill the functional requirements of the design criteria, and are consistent with operating plans, procedures, and rules; and
- Train signaling, traffic signaling, vehicle traction power, fare machine, and communication system documents are mutually compatible and coordinated. At the same time, verify that the right-of-way, trackwork, stations and storage, maintenance, and other permanent facilities defined in the documents under review will accommodate the system elements.

3.3.7.2 Pre-Revenue Testing

TriMet in coordination with C-TRAN, using its operating and maintenance personnel, will do pre-revenue testing. The purpose of the testing is to insure compatibility between various elements of systems and to make sure they work together. Also the test provides assurance that there are no conflicts between the civil and systems installations that would interfere with transit operations. The design consultants and systems contractors will provide assistance.

3.3.7.3 Compatibility with Existing Systems

Systems integration activities ensure that the new facilities and systems are compatible with the existing system. Final design plans and specifications for the civil line sections, systemwide elements, and the LRVs must share certain characteristics with the existing equipment and facilities. Among these characteristics are:

- Traction power voltage compatibility with the existing system
- Communication and signal systems features including automatic train stop and train-to-wayside
- Car body crush strength, collision post and anti-climber strength/location, and clearance envelope
- Vehicle performance such as motoring and braking rates, train line commands, mechanical and electrical coupling
- Consistent station platforms to enable all riders to board and depart
- An integrated approach to the provision of service to elderly and disabled patrons

3.3.7.4 Reliability, Dependability, Safety

Quality, safety, and other review processes are described below.

Quality Assurance Reviews

CRC will conduct formal quality assurance audits after major design submittals. These audits will assess compliance with the quality assurance programs.

Safety and Security Reviews

TriMet operations and safety staff in coordination with C-TRAN, ODOT, and WSDOT will conduct formal safety and security reviews of the design. These reviews will focus on operational safety and security of the completed system for passengers, automobile drivers and pedestrians. Contracted safety specialists may also be included in the reviews depending on the special features of the design under study.

A Safety and Security Committee will be established prior to the start of final design to review and resolve safety and security-related issues. The Committee will be comprised of internal stakeholders (e.g., Safety and Security, Operations, Maintenance, Community Affairs, and Legal). The LRT design leads will also be assigned to the Committee and will be responsible to implement the issue resolutions.

A related but separate committee is the Fire/Life Safety and Security Committee (FLSSC). In addition to the internal stakeholders represented on the Committee, other FLSSC members shall include area emergency responders, DOTs, and local government representatives. There will be discussion of safety and security issues primarily related to first responder roles, responsibilities, and routes during construction and revenue service.

3.3.7.5 ADA Reviews

CRC will conduct design reviews to ensure compliance with the requirements of the Americans with Disabilities Act (ADA) and coordinate participation by project partners through regular briefings of issues. Contracted ADA compliance specialists may also be brought in for design reviews.

3.3.7.6 Peer Reviews

CRC will use peer reviews to provide guidance to staff where appropriate. Some elements that are potential candidates for peer review include:

- Track sections
- Maintenance facility modifications
- Major structures
- Safety, security, signal, and communication systems
- New technologies being considered for use

Peer review panels will be composed of experienced design team personnel and experienced managers or operators from similar transit systems. Peer reviewers will be selected based upon several general guidelines:

- Experience in the specific areas under review
- Experience in the design and construction of other light rail systems
- Experience with the start-up period and actual operation of a similar system.

Daily agendas for meetings will be established and provided to peer review members prior to any meetings so they can develop a familiarity with the purpose of the meetings, the subject matter, and the project.

3.4 Station Area Planning and Development/Transit Joint Development

WSDOT, ODOT, C-TRAN, City of Vancouver, City of Portland, and TriMet will work in partnership with the property owners and local jurisdictions to enable and in some cases produce transit supportive development projects. Complementary efforts will include joint development funding, technical assistance, and community outreach.

The goal of station area planning is to promote “transit supportive” development near LRT stations. Transit supportive is defined as higher density, pedestrian-friendly development that encourages use of transit as an alternative to the automobile.

3.5 Construction Program

3.5.1 Construction Management

The construction management function is designed to maximize safety, quality, and cost efficiency of all construction activities. Construction management practices will conform to all federal and state regulations, including quality assurance, quantity control, materials testing, structural and architectural inspection, and compliance with county, state, and federal requirements covering contract procedures and fair employment.

Reflected here is the information available at the time of printing. Areas not complete will be addressed in future updates to the PMP.

3.5.2 Construction Management Organization

Construction of LRT will be implemented through individual construction packages. The construction management organization is a coordinated team of staff augmented as necessary by consultants. WSDOT in coordination with TriMet provides overall management and serves in most construction management positions. Consultants provide unique expertise or supplemental resources that are not available on current staff.

3.5.3 The Construction Manager

The Construction Manager (CM) will be responsible for the LRT construction and certain equipment and materials procurement administration from the date of each construction or procurement contract to the final turnover to the Light Rail Operations Division. In cases where responsibility for related activities is specifically under the control of other jurisdictions (such as the City of Vancouver) the CM is responsible for integration and coordination of those activities.

Prior to the award of a contract, the CM is responsible for verification that the contract milestones are compatible with the schedule, review of special construction-related contract requirements, and participation in value engineering studies.

During construction, the CM is responsible for monitoring contract compliance with the plans and specifications, construction warranties, maintenance provisions, contract documentation and as-built record requirements, AA/EEO provisions, DBE provisions, and contract close-out. Also, the CM is responsible for contract administration procedures and construction safety.

The CM's duties are:

1. Direct the activities of the construction management team, including staff and consultants, plus assigned local jurisdiction engineers and inspectors.
2. Review plans for constructability and compatibility with technical specifications and construction schedule and assist in preparation of general conditions for all contracts, special conditions for each contract and contract administration procedures.
3. Provide technical assistance and advice for REs on construction management issues faced on individual contracts.
4. Assign construction management support staff to assist REs managing individual contracts, as work requires.
5. Oversee the procurement, delivery, and hand-off to appropriate contractors of Agency supplied construction materials.
6. Manage the construction management consultant contract (if applicable).
7. Manage materials testing, survey, and other construction support contracts.
8. Coordinate the resolution of construction-related design issues with civil and systems engineering managers and Rail Operations, working closely with design teams to ensure responsiveness of design support during construction.
9. Provide information to Project Control to facilitate schedule and budget monitoring related to construction contracts and to ensure schedule, estimating, and cost engineering support for the REs.
10. Integrate quality control/quality assurance functions, together with construction safety and system safety assurance programs into the efforts of the construction management team.
11. Oversee the implementation of policies and procedures for control and monitoring of construction contract time or cost change, progress documentation, submittal review, inspection records, and progress payments.
12. Participate in the dispute resolution process.

13. Provide briefings on progress and construction issues to the CRC, TriMet, WSDOT, C-TRAN, Project Steering Committees and Project Management Groups, TriMet Board, FTA, and other policy level groups.

14. Participate with other senior staff in monitoring contractor's compliance with the safety programs of TriMet and insurance providers.

3.5.3.1 The Resident Engineer

A Resident Engineer (RE) will be assigned to each construction contract. The RE reports to the CM. The RE will be responsible for administration of the contract after the design process is complete. The RE is the primary field representative and is the contractor's single point of contact. The RE receives all submittals, requests for information, field memos, and change order requests and ensures that the work is constructed in accordance with the requirements of the plans and specifications.

The RE will be the day-to-day contact between WSDOT, C-TRAN, or TriMet (contract dependent) and the contractor, and will administer all contract matters. Changes to the contract package involving scope, cost, time quality, or quantity will be made only through the RE, and only after securing all necessary approvals as required elsewhere in this PMP.

Work to be done under any contract will not be considered complete until it has passed final inspection by the RE. The contractor must carry out the instructions of the RE insofar as they concern the work to be done under the contract. The RE will have the authority to direct unacceptable work to be removed, and to deduct the costs of removal and replacement with acceptable work from any monies due or to become due to the contractor.

Approval by the RE signifies favorable opinion and qualified consent. It does not carry with it certification, assurance of completeness or quality, or accuracy concerning details, dimensions, or quantities. The RE's approval will not relieve the contractor from responsibility for errors, improper fabrication, and nonconformance to a requirement, or for deficiencies within the contractor's control.

RE duties are summarized below:

1. Conduct regular meetings with the contractor.

2. Interpret the technical requirements of the contract and reject work of the contractor that does not conform to the contract.

3. Review or cause to be reviewed all contractor submittals, requests for information, change proposals, and all other correspondence and respond as appropriate.

4. Review work for conformance with the contract requirements and approve for payment, or take other action, upon the contractor's submittal.

5. Direct the analysis, preparation, and justification of change orders for approval and execution.

6. Evaluate the cost and benefit of any change orders.

7. Order minor changes in the work involving adjustment of the contract price within the RE's delegated authority and consistent with the intent of the contract.
8. Direct reasonable changes or adjustments in the work necessary to minimize construction impacts to businesses, residents, and/or the natural environment.
9. Conduct inspections to determine the overall conformance of the work, achievement, and dates of substantial completion and final completion.
10. Manage and oversee the work of the Assistant REs, Office Engineers, and Inspectors reporting to them.
11. Conduct constructability reviews of all contracts before they are bid or as required.
12. Assist in resolution of construction problems and problems among prime construction contractors; (Issues pertaining to subcontractors are the prime contractor's responsibility.
13. Coordinate construction site access, staging logistics, and interface among prime contractors.
14. Monitor adherence to construction contractor's schedules.
15. Maintain uniform, consistent, and reasonable standards of contractor management. Propose amendments to these standards as required.
16. Ensure that proper inspection, quality control, and quality assurance standards are observed. Ensure that all work complies with standards of applicable jurisdictions.
17. Ensure that contractors comply with safety and insurance programs.
18. Issue change orders as required.
19. Issue stop work orders when required to insure that work is done within specifications and initiate and manage Non-Conformance Report items through resolution, including notification of such items to the Quality Assurance Manager.
20. Direct emergency field changes (i.e., force account payment).
21. Oversee production of contract punch lists and approve work as it is completed.
22. Review and approve all reports and correspondence to prime construction contractors.
23. Review reports from the Assistant REs and Inspectors for adequacy and accuracy.
24. Review the Daily Inspection Diary documenting inspection, testing, and management activities.
25. Approve, modify, or reject Progress Payment invoices for completed work after quantity checks have been made, preparing correspondence to explain payment decisions.

The RE in each line segment or systems contract will be the leader in coordinating prime contractors' site access and use of property and facilities. The RE will facilitate the definition of contractual access and space priorities, inter-contract cooperation, and resolution of interface conflicts. The RE will promote cooperation and coordination, develop workarounds, and institute other measures to avoid or mitigate claims and preserve the schedule.

Information under the following two headings will be developed for later versions of this plan.

3.5.3.2 Conduct of Construction Plan

3.5.3.3 Bid Package Coordination

3.5.4 Construction Contract Administration

Contracting will be in accordance with FTA Circular 4220.1F, as revised, FTA Master Agreement (MA) dated October 1, 2007 or its successor, local ordinances, and state laws. Construction contract administration is the responsibility of the RE with assistance from the Program Control.

Information under the following headings will be developed during the preliminary engineering and final design phases and included in later versions of this plan.

3.5.4.1 Bidder Information

3.5.4.2 Request to Advertise

3.5.4.3 Bid Package Assembly

3.5.4.4 Pre-Bid Conference

3.5.4.5 Bid Opening

3.5.4.6 Award and Execution of Contracts

3.5.5 Construction Safety

3.5.6 Change Order Procedures

Currently, the change order process is expected to follow WSDOT Construction Manual M-41-01, Chapter 1, *Administration*, for contracts that are held procured by WSDOT. This process will be in consultation with TriMet, C-TRAN, and other partners, as appropriate. The following is the link to the Manual: http://www.wsdot.wa.gov/publications/manuals/fulltext/M41-01/Construction.pdf.

3.5.6.1 Field Orders

Circumstances arise in the field during construction that require immediate action to avoid delays. The RE has authority to issue a field order/minor change order directing immediate revisions when circumstances warrant. The Resident Engineer will provide direction to the contractor regarding the change and promptly process a notice to perform the work, on a time and materials basis or on an agreed upon unit cost basis. Field orders are logged in the Prolog system. In the event that a field order results in cost or schedule impacts, the corresponding field order is electronically linked to the resulting potential change order(s) in Prolog.

3.5.6.2 Time and Materials/Force Account Work

Work performed on a time and materials or force account basis will be paid for in the manner described in the contract specifications.

The contractor tracks actual labor, material, and equipment costs. Fully itemized invoices are submitted to the RE for comparison and verification against field observation. Payment will be made by change order and included with the next regular periodic progress payment, if approved by the RE.

3.5.6.3 Change in Quantities

Changes in the contract quantities are tracked by the RE and inspection staff during construction. Prior to contract closeout, reconciliation change orders are issued by the RE, as appropriate, to finalize actual quantities.

3.5.6.4 Change Order Processing

Upon receipt of the change proposal, the RE reviews the proposal and verifies the change is within the general scope. Program Management will update the cost tracking system with the proposal data and make an assessment of the cost and schedule impacts. Costs proposed are verified by an independent fair cost estimate prepared by the RE's staff or Program Management. Using this information, the RE leads negotiations with the contractor to arrive at a mutually agreed price for the work.

Next, the RE prepares a final justification and change order. The RE forwards the proposed change order to the contractor for signature. Once the contractor has signed the change order, the RE will return it to Program Management for confirmation of contract and legal sufficiency and further update of cost and schedule records.

WSDOT (and TriMet/C-TRAN for TriMet/C-TRAN-led contracts) can execute a unilateral change order should the contractor initially challenge the change or a price cannot be agreed upon. If a contractor disputes the unilateral change order, the RE Manual and the contract documents contain procedures for resolution. WSDOT, TriMet, and C-TRAN prefer to reach amicable negotiations and do not regularly use this option.

Information under the following headings will be developed during the preliminary engineering and final design phases and included in later versions of this plan.

3.5.7 Miscellaneous Construction Issues

3.5.7.1 Site Access

3.5.7.2 Contract Termination and Defaults

3.5.7.3 Bonding

3.5.7.4 Retainage

3.5.8 Contract Close-out

3.5.8.1 Pre-Final Inspection

3.5.8.2 Final Inspection

3.5.8.3 Contract Acceptance

3.5.8.4 Final Payment

3.5.8.5 Construction Claims Closeout K.6.6 Closeout Documentation

3.5.9 Utility Relocation

3.5.10 Quality Control

Quality control is a function of the field construction program and is carried out through REs, contractors, and inspection staff to ensure quality and conformance to plans and specifications from a technical aspect. Full details of this program and the responsibilities of the construction management team in its implementation are described in the Quality Control/Quality Assurance Plan.

3.6 System Safety and Security

The LRT will be constructed and operated in accordance with standards promulgated by the Federal Government (DOT/FTA, and Department of Homeland Security (DHS)/Transportation Security Administration (TSA), ODOT, WSDOT), and other accepted practices. During the Final Design phase a detailed plan will be created.

Reflected here is the information available at the time of printing. Areas not complete will be addressed in future updates to the PMP.

3.6.1 Commitment and Philosophy

CRC is committed to developing and maintaining a safe and secure workplace as well as a project that yields a safe and secure travel environment. This philosophy is embodied in the Safety and Security Management Plan (SSMP).

The first draft of the SSMP was completed and submitted in July 2008, and is awaiting FTA review and execution. The draft SSMP details the strategies and describes the integration of safety and security activities for an effective safety and security program designed to reduce the potential for accident/incidents. The draft SSMP describes the methods for identifying and resolving hazards and vulnerabilities associated with LRT, its customers, and those who come in contact with it. It establishes accountability for safety and security and outlines policies and goals throughout the organization and parties responsible for operating and maintaining the light rail system.

The draft SSMP includes a detailed schedule of all related documentation required.

3.6.2 Organizational Responsibilities

CRC staff and partners will follow the successful model used on previous projects in the Portland Metropolitan area to develop roles and responsibilities to ensure safety and security goals are met.

Information under the following headings will be developed during PE and Final Design, and included in later versions of this plan.

3.6.2.1 System Safety and Security Agency and Organization Chart

3.6.2.2 System Safety and Security Director

3.6.2.3 System Safety Manager

3.6.2.4 System Safety Specialist

3.6.3 Safety and Security Integration in Design, Testing, and Start Up

TriMet established comprehensive safety and security programs for construction and operation of the tri-county regional transit system. The programs establish technical and managerial strategies for identification, assessment, prevention, and response for hazards and accidents involving passengers, employees, and persons who come in contact with the transit system. The requirements of the plan as they relate to safety and security provisions in design, construction, operational readiness, and LRT revenue service operations will be incorporated. Two key activities highlighted in this section are Design Reviews and the Safety and Security Certification Program.

3.6.4 Design Reviews

TriMet's and C-TRAN's safety and security staff will actively participate in safety and security reviews of the design. These reviews will be in accordance with the System Safety Program Plan (SSPP) and Security and Emergency Preparedness Plan (SEPP) and will focus on operational safety and security of the completed system for passengers, automobile drivers and pedestrians.

3.6.5 Safety and Security Certification

Certifiable Items Lists (CIL) will be identified early and approved by the Safety and Security Committee and tracked throughout the life of the project to verify design and construction conformance.

Information under the following headings will be developed during the preliminary engineering and final design phases and included in later versions of this plan.

3.6.6 Construction Safety

3.6.6.1 Construction Safety Policy

3.6.6.2 Contractors' Safety Programs

Emergency Preparedness Plan

Hazardous Materials

Hazardous Waste

3.6.7 Security and Emergency Preparedness

3.6.7.1 Security

3.6.7.2 Emergency Preparedness

3.6.8 Preliminary Hazard Analysis (PHA)

3.6.9 Crime Prevention Through Environmental Design (CPTED)

CPTED is described as, "the proper design and effective use of the built environment that leads to a reduction in the fear of crime and incidence of crime, and to an improvement in quality of life." The goal of CPTED is to reduce opportunities for crime by creating a climate of safety right from the start by designing a physical environment that positively influences human behavior.

CPTED analysis will be used during final design with the goal of identifying issues in order to eliminate or mitigate them through design.

3.6.10 Rail State Safety Oversight

At the direction of the U.S. Congress, the FTA issued a regulation requiring states with a fixed guideway rail transit system within its borders to institute a safety oversight program. The original regulation, 49 CFR, Part 659, Rail Fixed Guideway System; State Safety Oversight, was published on December 27, 1995 and a revised rule was published on April 29, 2005. TriMet, in coordination with C-TRAN, will develop a system safety and security program, as described above that complies with program standards.

3.7 Conflict Resolution and Claims Management

Information under the following headings will be developed during the preliminary engineering and final design phases and included in later versions of this plan.

3.7.1 General Approach

A formal program will be prepared following PE.

3.7.1.1 Contractor/Owner Relationship

3.7.1.2 Claims Management Guidelines

3.7.2 Dispute Resolution Process

3.7.2.1 Disputes

3.7.2.2 Claims

3.7.2.3 Record-Keeping

3.7.3 Alternatives to Litigation

3.7.3.1 Partnering

3.7.3.2 Mediation

3.7.3.3 Disputes Review Board

3.8 Public Art Program

At the time of printing, since TriMet's program has been vetted by FTA, the CRC is planning to model the LRT art program after TriMet's most current efforts—stated here.

CRC will include public art with the transit construction for the benefit of the general public. The goal of the public art program is to encourage increased transit usage and community pride by integrating art works into the transportation system, thereby celebrating the contributions of public transportation and recognizing the cultural richness in the region. The program is administered in accordance with the requirements of FTA Circular 9400.1A, "Federal Transit Administration Design and Art in Transit Projects" and FTA Best Practices, Chapter 6.7.

The art program will be modeled after the successful examples and processes used on previous LRT projects in the region. Artists will be hired early in final design phase to collaborate with the architects and engineers. Selected art projects or themes will be integrated into the transit facility itself and not simply added into the facility as stand-alone pieces. Art will serve to create an identity for each station or facility based on the history, culture, and character of the surrounding area.

3.8.1 Organization

TriMet's Public Art Manager of the Capital Projects and Facilities Division will coordinate the public art program. Specific duties include:

- Implementing the art program with input from the Public Art Advisory Committee.
- Assisting in outreach efforts to gather program input and support from the community.
- Retaining, administering, and managing artists for the art project(s).
- Coordinating between design and construction work and art project(s).

3.8.2 Budget and Funding

The public art budget will be established during PE. The art program budget includes cost of the art as well as the design and construction costs to incorporate the art into the facilities.

3.8.3 Art Development and Integration

CRC may establish a Public Art Advisory Committee to provide oversight of public art in light rail projects. The committee is comprised of community representatives, artists, city leaders, and staff.

The Public Art Advisory Committee's roles could include:

- Selection of artists to develop plans, articulate themes, and identify potential art projects
- Approval of identified projects
- Oversight and advice on art program implementation

Should special issues regarding the art program arise, TriMet can obtain assistance through the services of the Regional Arts and Cultural Council (RACC). Experienced experts in the field of public art are available for consultation in the areas of programming, community involvement, artist selection, and design integration. The design team will be responsible for incorporating the art into the final design. Manufacture and installation of the art may be incorporated into the construction contract(s) or may be the responsibility of the artist. Any art requirements incorporated into the construction contracts will be the joint responsibility of the Public Art Manager and the RE.

3.8.4 Maintenance of Art Elements

Delineation of the roles and responsibilities for the ongoing care and maintenance of the art will be determined during the Final Design phase.

3.9 Planning for Operations Start-Up

TriMet has successfully integrated new and existing service on the Metropolitan Area Express (MAX) light rail system on prior extension start-ups. These start-ups include:

- Westside/Hillsboro Light Rail (Blue Line) Extension, September 1998
- Airport Light Rail Extension (Red Line), September 2001
- Interstate MAX Light Rail Extension (Yellow Line), May 2004
- South Corridor Extension (Green Line), on track for September 2009

In each case, start up culminated over a year of ever-intensifying pre-revenue testing, training, and other preparatory activities. The primary goal of the system testing and start-up program is a revenue service opening that incorporates the lessons learned and builds upon the successes achieved on previous extension start-ups.

3.9.1 System Testing Procedures, Analysis, and Results

This section describes the objectives, methodology, management controls, and major milestones in the conduct of a test program intended to verify LRT's readiness for revenue operations.

3.9.1.1 Objectives

Listed below are the objectives of the system testing and start-up program:

- Develop and execute a comprehensive testing program
- Verification of contract compliance
- Validation and demonstration of system performance
- Demonstration of safety, security, and service characteristics
- Training of TriMet and/or C-TRAN personnel, and integration of personnel, equipment, and procedures into TriMet's overall operations
- Full collaboration with C-TRAN operations

3.9.1.2 Types of Tests

Information under the following headings will be developed during the final design phases and included in later versions of this plan.

Qualification or Proof of Design Testing

Manufacturing Tests

Acceptance Tests

System Tests or Integrated Tests

Pre-Revenue Testing

3.9.1.3 Test Management Approach

3.9.1.4 Establish Requirements

3.9.1.5 Perform Tests

Contractor Off-Site Tests

Contractor On-Site Tests

TriMet Tests

3.9.1.6 Report Test Status, Document Results

Test Documentation

Test Completion Reports

3.9.2 Modifications or Retrofits

3.9.3 Start-Up Planning

Start-up of the light rail line is an inherently complex process requiring exceptional intra-agency coordination and planning. Anticipated challenges are:

- The construction and integrated testing phases will be nearing completion, a point in the overall process that is often exceptionally time sensitive and for which few "work-arounds" are available to deal with unresolved issues.
- Additional operations personnel are needed to operate the new line as an extension of the existing light rail line.
- General growth in other transit service areas is needed to support growth in rail, fixed-route bus, and paratransit operations well in advance of the commencement of new light rail operations.

Approximately two years in advance of revenue operations, TriMet will designate a Start-up Coordinator and C-TRAN will identify a lead for coordination. The position will be responsible for managing the identification, critical path scheduling, coordination, and progress reporting of all activities directly supporting the commencement of revenue operations.

Each department involved will be accountable for its respective responsibilities during start-up. For TriMet the most heavily involved groups will include: the Project, Rail Transportation, Bus Transportation, Transportation Planning, Safety and Security, and Marketing and Customer Service.

3.9.3.1 Start-up Plan

The Start-up Coordinator will convene a Start-up Steering Group to oversee the start-up effort. The first priority of the Steering Group will be to guide the development of a comprehensive Start-up Plan. The plan will outline the procedures and policies necessary to activate and operate the light rail line and the key steps (testing, staffing, training, etc.) and timetable required.

The start-up activities program will continue past the date of commencement of revenue operations until all identified open items in the program have been closed.

Information under the following headings will be developed during the preliminary engineering and final design phases and included in later versions of this plan.

3.9.3.2 Start-up Schedule

3.9.3.3 Start-Up Target Date

3.9.4 Operations Planning

3.9.4.1 Basic Operating Plan

3.9.4.2 Rail Transportation Plan

3.9.4.3 Rail Maintenance Plan

3.9.5 Operations Staffing

3.9.6 Operations Training

3.9.6.1 Contractor Provided Training and Manuals

Training Manuals

Maintenance Manuals

Light Rail Vehicle Training

Traction Electrification System (TES) Training

Signal System Training

Fare Equipment Training

Shop Equipment Training

Non-Revenue Equipment Training

3.9.6.2 TriMet Provided Training

Rail Transportation Training

Rail Vehicle Maintenance Training

Track Maintenance Training

3.9.6.3 Orientation for Employees

3.9.7 Spare Parts and Inventory Control

3.9.8 WSDOT and ODOT Crossing Order Approvals

CRC will coordinate with state highway agencies responsible for approving and certifying certain safety elements of the LRT system, namely, railroad-type (gates and flashers) grade crossing protection equipment.

3.9.9 System Opening and Revenue Service

Information under the following headings will be developed during the preliminary engineering and final design phases and included in later versions of this plan.

3.9.10 Operations Description

3.9.10.1 Routing and Frequencies

3.9.10.2 Travel Time and Ridership

This page left blank intentionally.

4. Management/Implementation of Highway/Bridge

4.1 Introduction

4.1.1 Overview

CRC utilizes the combined experience and resources of FHWA,WSDOT, and ODOT to manage and implement the highway and bridge elements of the project. WSDOT and ODOT have over 140 years of combined experience in planning, designing, constructing, operating, and maintaining highway and bridge facilities, among others. Each agency has a developed organizational structure and process to meet the needs of both the National Highway System and state-owned facilities. WSDOT and ODOT staff members who have direct oversight for the CRC highway and bridge design are co-located in the CRC project office, as detailed in Section 2.1. However, each agency has needed knowledge, resources, and mechanisms available to coordinate, evaluate, and approve various components of the highway and bridge design.

This section describes the overall management and implementation for the highway and bridge elements of CRC. Additionally, this section describes technical resource personnel available to CRC from FHWA, WSDOT, and ODOT, and details how the coordination and approvals will occur from each agency.

4.1.2 Project Summary Description

The DEIS evaluated several project alternatives before agreement on the LPA. The LPA calls for a replacement Columbia River crossing structure and improvement of interchanges within the BIA. Additional detail for the LRT project description can be found in Section 1.2.2.

4.1.3 Policy and Governance

WSDOT and ODOT operate as stewards for the National Highway System and their respective state routes. FHWA provides oversight to WSDOT and ODOT for projects associated with the National Highway System and/or projects that utilize funding provided by FHWA.

WSDOT is a cabinet agency under the Washington State Governor, and reports directly to the Governor, Washington State Legislature, and the Washington State OFM. The Washington State Transportation Commission (WSTC) makes policy recommendations to the Governor and the Legislature. The Transportation Commission is composed of seven commissioners appointed by the Governor. Policy is implemented by the Secretary of Transportation.

ODOT reports to the Oregon State Governor, the Oregon Transportation Commission (OTC), and the Oregon State Legislature. OTC is composed of five commissioners appointed by the Governor, and is responsible for establishing state transportation policy. Policy is implemented by the ODOT Director.

4.2 Agency Organizations, Resource, and Approval Staff

4.2.1 Highway/Bridge Engineering and Organization Summary

- As previously stated, WSDOT and ODOT jointly oversee and manage the implementation of the highway and bridge components of the CRC project. Direct management and oversight is provided through key personnel co-located in the CRC project office, as described in Section 2.1 and shown in the CRC organizational chart. In addition to the co-located key personnel devoted entirely to the CRC project, ODOT and WSDOT have specialized resource and technical staff available to advise CRC staff, as needed. ODOT and WSDOT have also developed processes and operating procedures to review design development, obtain approvals, and ensure adherence to standards. CRC will coordinate the appropriate staff from each state to obtain the necessary design reviews and approvals.
- ODOT and WSDOT also have existing maintenance programs and staff utilized to maintain and operate facilities after construction. Coordination with this staff is needed to obtain information on existing deficiencies, confirm future maintainability of CRC, and plan for any additional resource needs that may result from the implementation of CRC.
- The following sections will describe the agency organizations, and their components are necessary for resource and approval needs for the Highway and Bridge components of CRC.

4.2.2 WSDOT Organization

4.2.2.1 WSDOT Divisions

WSDOT is composed of 14 operating divisions to cover an array of the state's transportation needs. The following is a list of the WSDOT divisions, and a brief description of the responsibility and potential role in the project.

- Strategic Planning & Finance
  - Responsible for working with the legislature to coordinate planning and development of overall programs and projects. Focus on building and managing the WSDOT program for future biennia, as well as establishing program and subprogram funding levels.
  - CRC will interact with the Systems Analysis and Program Development (SAPD) Office, a component of the Strategic Planning and Finance Division, for financial planning need to implement CRC.
- Administration
  - Responsible for agency administrative needs including accounting, human resources, information technology (IT), and enterprise risk management.
  - CRC will interact with this division to accomplish several needs. As WSDOT maintains fiduciary responsibility for the project, the Accounting section will produce payment on CRC contract invoices. Human Resources will aid in WSDOT CRC

employment, training and disputes, among other employee-related needs. Information Technology section will maintain the CRC IT facility needs from a local office in Vancouver, Washington. The Enterprise Risk Management office will aid in Risk Management and Insurance needs for the project detailed in Section 2.2.2.

- Audit Office
  - The WSDOT Internal Audit Office offers a variety of services, including internal audits, ethics investigations, monitoring employee use of state resources, and advisory to management staff.
  - As all contracts are currently issued through WSDOT, the Audit Office will periodically perform audits and advisory services related to consultant contracts and inter-agency contracts at pre-award, 14 months into contract, and after final contract completion. However, an audit may be conducted at any time during the life of an agreement. A full discussion on this process can be found in the Audit Guide for Consultants.
- Engineering and Regional Operations
  - This division is primarily responsible for the WSDOT Highway Capital Improvements and Preservation Program. Led by the Assistant Secretary of Transportation, this division has seven regions responsible for project development and maintenance of the Washington State's highway system. Additionally, this division is responsible for maintaining the biennial program budget and reporting on program development and operations.
  - Regional and Headquarters staff will review, advise, and approve designs for the highway and bridge components of the CRC project for adherence to standards and quality. This coordination, review, and approval process is further detailed in Section 4.3.3.3 below.
- Highways and Local Programs
  - The WSDOT Highways and Local Programs Office provides educational, technical, and financial support with federal oversight to local customers to help them achieve their transportation goals.
- Public Transportation
  - The Public Transportation Division aspires to create an integrated state transportation system where innovative solutions are developed and implemented to maximize the efficiency and effectiveness of individual, community, and systemwide mobility.
  - This office will support WSDOT as grantee for FTA funds and coordination. The Assistant Director of WSDOT's Public Transportation division is co-located in the CRC office part-time, and assists the Directors and Transit Managers with CRC's implementation of the transit components of the project.

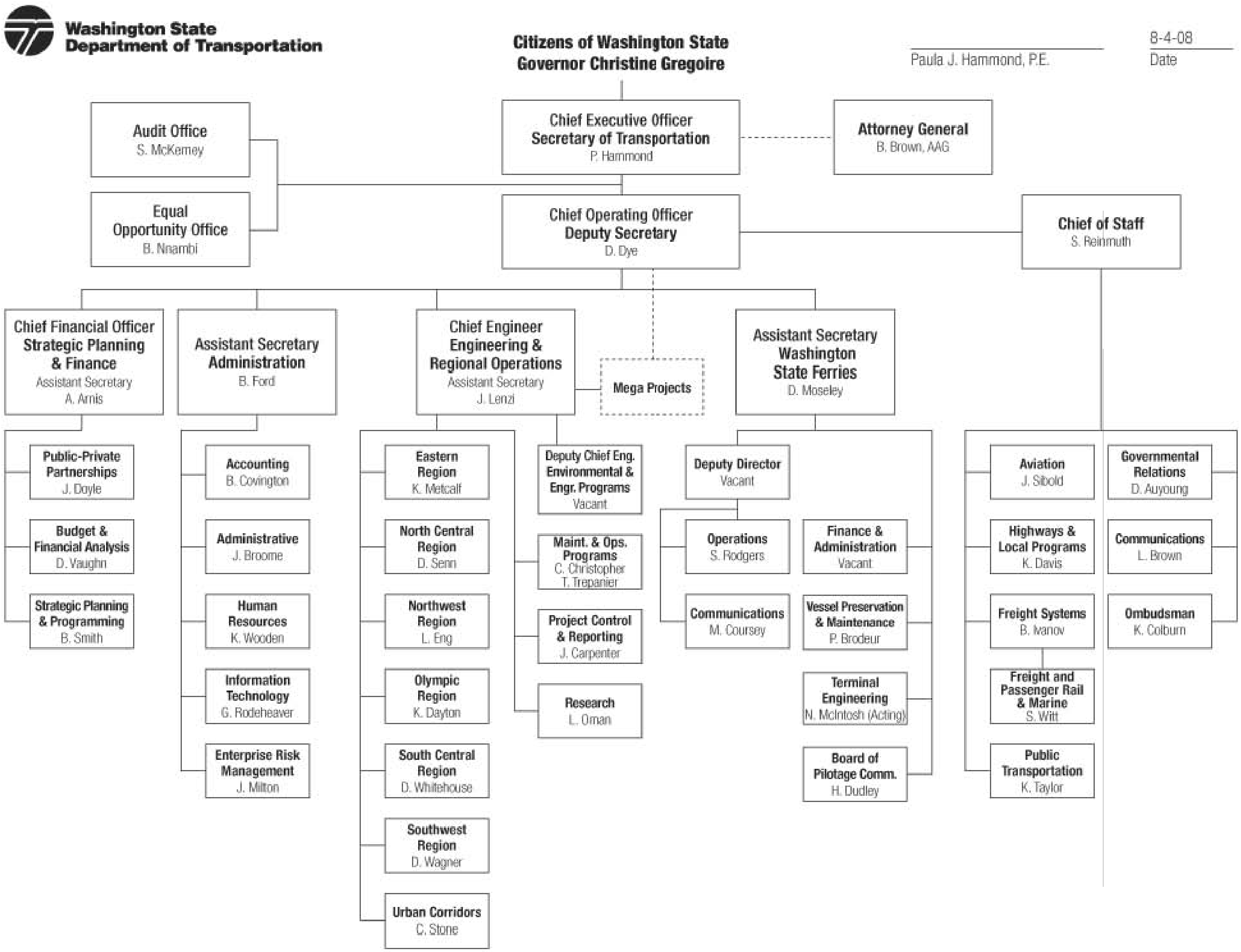
- Aviation
  - The WSDOT Aviation Office is responsible for protecting and preserving Washington State's 139 public use general aviation airports.
  - The WSDOT Aviation Office will support CRC in discussions with Pierson Airfield and FAA permitting needs.
- Freight Systems
  - The WSDOT Freight Systems Division supports Washington's freight systems by providing strategic planning for all state freight investments and directly managing the state's rail programs.
  - This Division will aid CRC in coordination with freight-related issues, communications, agreements, and other needs associated with trucking, rail, and marine systems.
- Governmental Relations
  - The WSDOT Governmental Relations Division has the primary responsibility for assisting tribes and the department with implementing effective government-to-government relations. This office also will work with other governmental agencies or organizations to ensure proper communication and discussion of issues between parties.
  - This office will support CRC primarily with tribal-related communications and issues. The Tribal Liaison Office, part of the Governmental Relations Division, provides assistance and advice in all areas that related to tribal communication and decisions.
- Communications
  - WSDOT employs communication professionals to keep the public informed about the activities of the agency; whether it's new construction projects, maintaining the existing transportation systems, managing traffic, commuters checking their commute before they leave home or the office, helping drivers check mountain pass conditions, providing weather information, tracking agency performance, and many more.
  - CRC employs an internal communications team. The WSDOT communications office may provide advice and assistance to the CRC communications team, should it be necessary.
- Ombudsman
  - WSDOT's Ombudsman has the responsibility for investigating whether the department's decision-making may have been unreasonable, unfair, arbitrary or improper, and if it has, helping to set matters right. In all matters where the Ombudsman is authorized to act, the Ombudsman is vested with independent discretion whether to act or not to act.
  - Should a dispute arise related to the decision making process at CRC, the Ombudsman will investigate and act on any findings that may occur. The

Ombudsman may work with or independently of the Washington State Office of the Attorney General (AGO).

- Washington State Ferries
  - This division is responsible for operating, maintaining, and further developing the state ferries system and fleet.
- Equal Opportunity Office
  - The OEO manages and monitors the Washington State Department of Transportation's Equal Opportunity, Affirmative Action, Contract Compliance, and Non-Discrimination programs.
  - CRC will interact with the OEO office as needed to aid in the settlement of compliance issues that may arise during the life of the project. CRC and WSDOT's OEO office may need to interact with offices from other agency to settle potential interagency disputes related OEO's programs.
- Washington State Office of the Attorney General
  - While not a division of WSDOT, the AGO aids WSDOT in providing legal advice on a variety of issues, including regulatory compliance, tort claims, labor contracts, agreements, and many others.
  - The AGO will support CRC in reviewing agreements and disputes to ensure compliance with state and federal laws. Due to the bi-state nature of this project ODOT, FTA, and FHWA legal council will likely be needed for concurrence on legal compliance issues.

This page left blank intentionally.

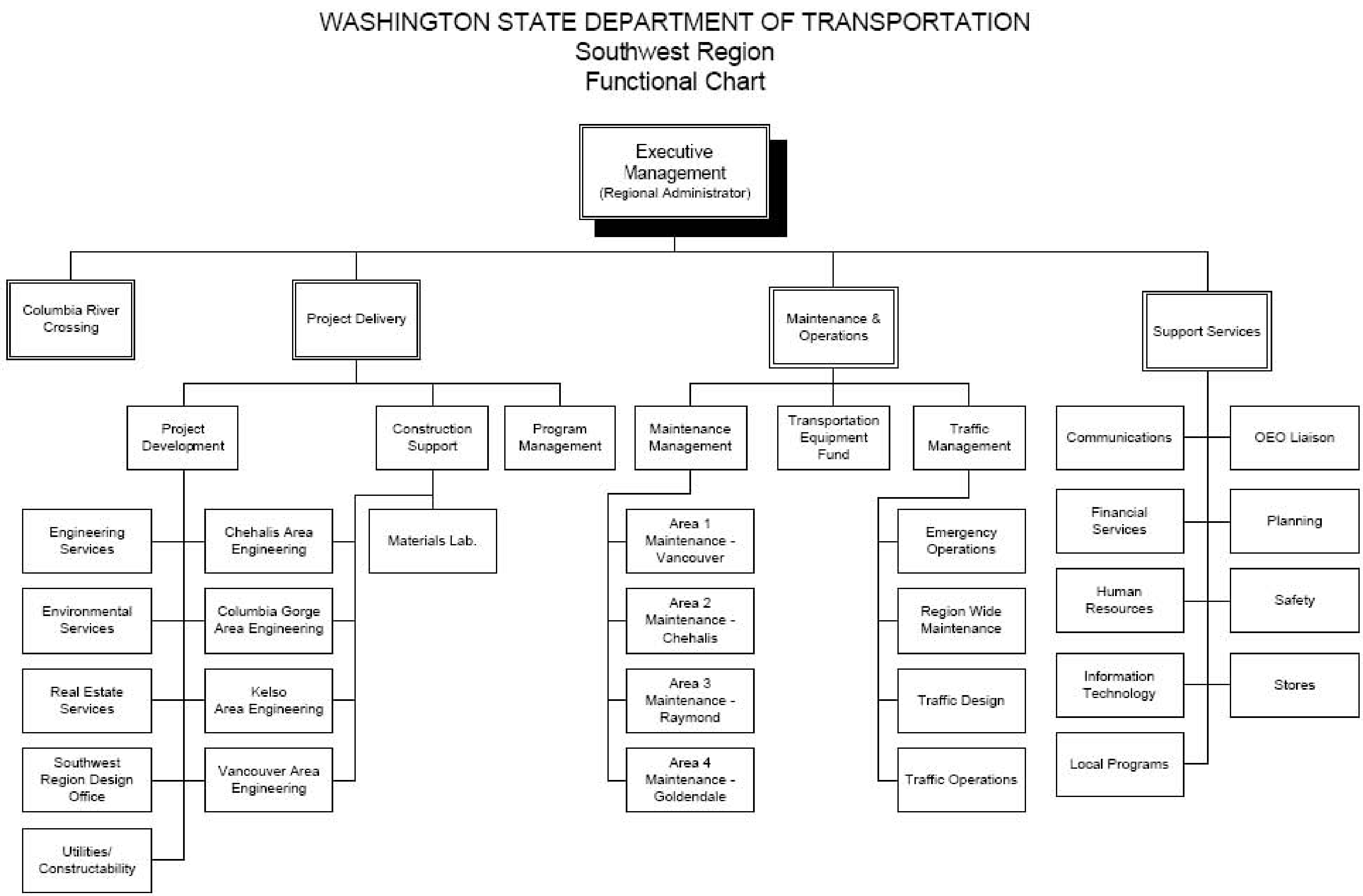
Figure 4-1. WSDOT Organizational Chart



•

This page left blank intentionally.

Figure 4-2. WSDOT Southwest Region Functional Organizational Chart



This page left blank intentionally.

4.2.3 ODOT Organization

4.2.3.1 ODOT Divisions

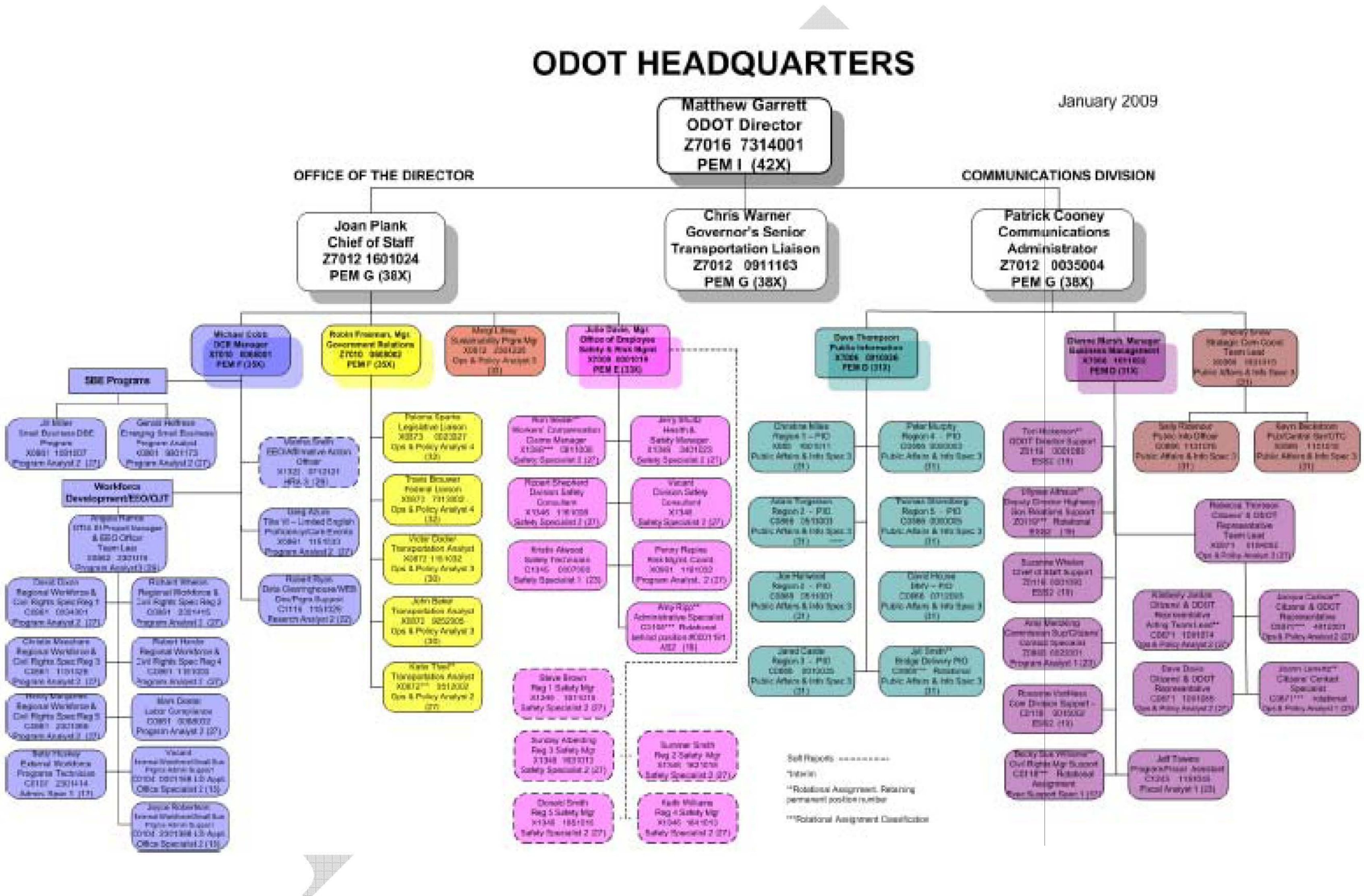
ODOT is composed of ten operating divisions to cover an array of the state's transportation needs. The following is a list of the ODOT divisions, and a brief description of the responsibility and potential role in the project.

Office of the Director

- Central Services
  - The Central Services Division provides services that support all operations within the Oregon Department of Transportation. The Division consists of Financial Services (including Budget), Human Resources, Information Systems, Audit Services (including Ethics/Safe Haven), and Support Services.
  - CRC will interact with this division to accomplish several needs. Financial Services section will coordinate with WSDOT accounting and program management offices to track and monitor funding and expenses from ODOT. Human Resources will aid in ODOT CRC employment, training, and disputes, among other employee-related needs.
- Communications
  - Communications is responsible for ODOT's internal and external media, and educates and provides information about ODOT programs and activities.
  - CRC employs an internal communications team. The ODOT communications office may provide advice and assistance to the CRC communications team, should it be necessary.
- Department of Motor Vehicle (DMV) Services
  - The DMV mission is to promote driver safety, protect financial and ownership interests in vehicles, and collect revenue for Oregon's roads.
- Highway
  - The Highway Division is ODOT's most visible arm, spread across Oregon with engineers, road crews, and a wide array of other disciplines involved in the maintenance of the state's highways, bridges, and other parts of the transportation system.
  - Regional and Headquarters engineering and maintenance staff will review, advise, and approve designs for the highway and bridge components of the CRC project for adherence to standards and quality. This coordination, review, and approval process is further detailed in Section 4.3.3.3 below.

- Motor Carrier
  - The mission of the Motor Carrier Transportation Division is to promote a safe, efficient, and responsible commercial transportation industry by simplifying compliance, reducing regulatory requirements, wherever appropriate, preserving the infrastructure, enhancing the private/public partnership, fostering effective two-way communication, and delivering superior customer service while recognizing the vital economic interests of the commercial transportation industry.
  - This Division will aid CRC in coordination with freight-related issues, communications, agreements, and other needs associated with trucking systems.
- Public Transit
  - To provide a means of state financial assistance and coordination to meet the state's mobility needs and achieve ODOT's vision for public transportation.
- Rail
  - The Rail Division represents and advocates for customers of railroads, both passenger and freight, to ensure a safe, efficient, and reliable rail transportation system.
- Transportation Development Division (TDD)
  - TDD is responsible for producing the long-range Oregon Transportation Plan, the Oregon Highway Plan, as well as individual plans for specific highway corridors. TDD is also the home of interagency partnerships that are helping to shape the Oregon of the future, such as the Transportation Growth Management program and Oregon's Community Solutions Teams.
  - CRC will coordinate with ODOT's TDD to aid in the future transportation planning needs as a result of CRC. The TDD may also support CRC in the development of interagency agreements during the PE and Final Design phases of the project.
- Transportation Safety
  - The division provides information, direct services, grants, and contracts to the public and to partner agencies and organizations. More than half the funding comes from federal funds earmarked for safety programs. The division administers more than 550 grants and contracts each year to deliver safety programs to Oregon citizens.
  - CRC may choose to consult with the ODOT's Transportation Safety division in development of the Safety and Security Plan for the highway component of this project. CRC will also use data from this division to determine existing safety deficiencies within the project area that CRC may have an opportunity to correct.

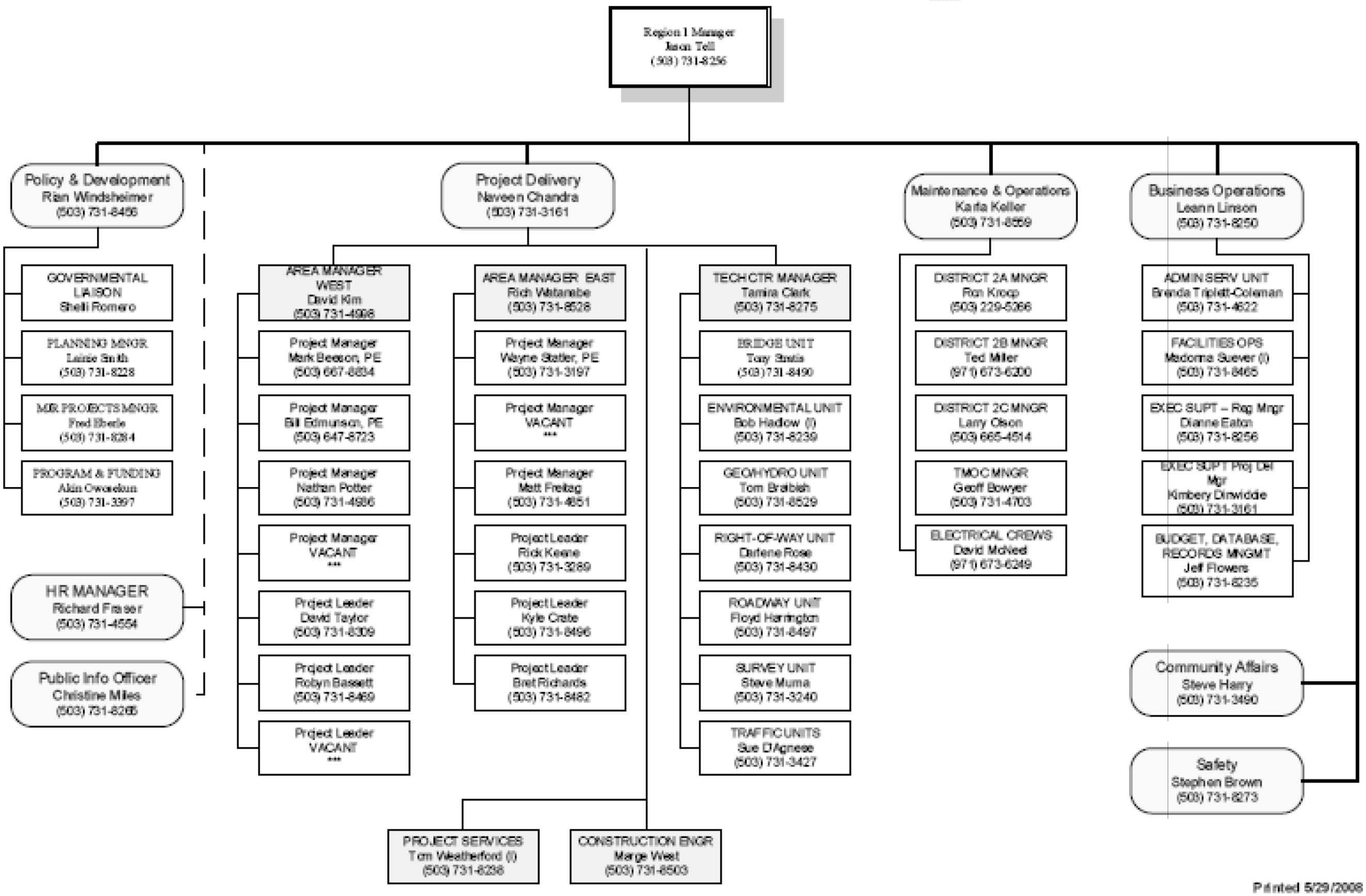
Figure 4-3. ODOT Organizational Chart



•

This page left blank intentionally.

Figure 4-4. ODOT Region 1 Organizational Chart



This page left blank intentionally.

4.3 Design Program

4.3.1 Requirements and Standards

The CRC is a multijurisdictional project, and several differing design requirements and standards apply. FHWA, WSDOT, ODOT, the City of Portland, and the City of Vancouver all have varying standards, documentation, records retention requirements, review, and approval processes. As part of the DEIS, CRC developed a preliminary assessment and agreement on some design standards published as the Final Design Criteria Technical Memorandum. Decisions for the application of design standards was divided into Roadway, Stormwater, Structures, and Geotechnical engineering sections. As the CRC moves toward FEIS completion, a final decision will be necessary for design standards projectwide. The Design Approval/Acceptance Approval (See Section 4.3.3.3) will freeze the standards for the project.

Generally speaking, design standards for each agency will be applied within their own respective jurisdictions. The 2008 American Association of State Highway and Transportation Officials (AASHTO) Green Book provides the minimum design standards for most components applied to the roadway elements of the project. Should CRC not meet the minimum standards, a Design Deviation/Exception (see Section 3.3.1) will document why the standard could not be met, and any mitigation measures taken.

4.3.2 Design Management

4.3.2.1 Roadway Design

The Highway Manager is ultimately responsible for the consultant management and design development of the Highway and roadway components for CRC. This includes roadway, stormwater, traffic, illumination, landscaping, intelligent transportation system, right-of-way, erosion, and sediment control engineering design. The Highway Manager has co-located DOT support staff as Leads for each of the aforementioned disciplines. The Leads are responsible for consultant oversight; monitoring the scope, schedule, and budget, as well as providing the initial quality assurance for products produced by the consultant design teams. Consultant Task Leads manage the scope, schedule, and budget. They also provide a quality control function on products produced by their discipline(s). See Figure 2-1 for a display of the Highway Engineering organizational network.

4.3.2.2 Structural Design

The Structures Manager is ultimately responsible for the consultant management and design development of the Structural components of CRC. This includes geotechnical investigations, architectural, foundation, bridge, wall, and tunnel engineering design. The Structures Manager has co-located DOT staff as Leads for each of the aforementioned disciplines. The Leads are responsible for consultant oversight; monitoring the scope, schedule, and budget, as well as providing the initial quality assurance for products produced by the consultant design teams. Consultant Task Leads manage the scope, schedule, and budget, as well as providing a quality control function on products produced by their discipline(s). See Figure 2-1 for a display of the Structural Engineering organizational network.

4.3.3 Design Coordination

Coordination of design both internally and externally is the most important aspect of project delivery. The following sections detail how we coordinate the CRC design development among various parties.

4.3.3.1 Coordination Meetings

CRC managers have developed several meeting to ensure coordination among the various interested parties during design development. The following sub-sections describe the various ways design components are communicated.

Partner Agency Coordination

Several meetings currently exist to work through design issues and communicate project information to the CRC Project Partners. The following table lists the current partnering coordination meetings, subject matter, and meeting frequency.

Meeting Name	Meeting Frequency	Meeting Intent
SASS	Monthly	This group is responsible for meeting to discuss key decisions and financial needs for the project. This group also serves as a final dispute resolution body for CRC partnering agencies.
FTA/FHWA Conference Call	Every 2 weeks	This meeting is intended to update the Federal Partners on project status, hear concerns and needs from the Federal Partners, and resolve issues related to the overall coordination and project delivery.
City of Vancouver & C-TRAN Coordination Meeting	Every 2 weeks	The intent of this meeting is for COV, C-TRAN, WSDOT, and CRC staff to discuss localized design and coordination issues related to both the highway and transit components of the project.
CRC Design Meeting (OR)	Every 2 weeks	The intent of this meeting is for CRC engineering staff to meet with ODOT Regional and Headquarters staff to discuss highway design issues, seek advice, discuss approval and documentation protocols, and all other engineering-related needs for the highway component of the project.
CRC Design Meeting (WA)	Every 2 weeks	The intent of this meeting is for CRC engineering staff to meet with WSDOT Regional and Headquarters staff to discuss highway design issues, seek advice, discuss approval and documentation protocols, and all other engineering-related needs for the highway component of the project.
InterCEP	Monthly	The goal of InterCEP is to allow the CRC project to efficiently plan, design, and build a solution that successfully addresses the project's goals and meets state and federal environmental regulations.
Tribal Consultation	As Needed	The tribal consultation process includes seeking review and input from affected tribes to help resolve concerns at each of the major project milestones. In addition, document review, face-to-face meetings and multi-tribal and /or multi-agency meetings will take place.

Stakeholder Coordination

Stakeholder support is necessary to increase the effectiveness of project delivery and ensure the best possible product for all interested parties. Regular working group discussions with stakeholders allows CRC to better develop context sensitive solutions. The following table lists the current stakeholder and working groups aiding the project. These groups are also listed in Section 2.7.6.3. CRC may find a need to form new groups as issues arise during design development.

Meeting Name	Meeting Frequency	Meeting Intent
PSC	Monthly	The Governors of Oregon and Washington formed the PSC to advise the departments of transportation on project development. PSC recommendations will be made after considering technical information, receiving input from advisory groups, and reviewing public comments. This group is charged with advising the project on these issues: completion of the EIS, project design, project timeline, sustainable construction methods, compliance with greenhouse gas emission reduction goals, and financial planning.
Community and Environmental Justice	Monthly	To achieve the goal of meaningful public involvement in the project development process, Columbia River Crossing formed the CEJG. The members of the CEJG come from neighborhoods in the project area and include environmental justice communities (low-income, African American, Latino) and at-large members. They represent the diverse interests and perspectives of Vancouver, Portland, and Hayden Island neighborhoods potentially affected by the project.
Freight Working Group	Every other Month	The FWG meets every other month to advise and inform the Columbia River Crossing project team about freight issues. The group provides insight, observation, and recommendation about the needs for truck access and mobility within the corridor; characterizes the horizontal and vertical clearances, acceleration/deceleration, and stopping performance needs of trucks that must be accommodated; provides meaningful comments on the effect of geometric, regulatory, and capacity changes on truck movements in the corridor; provides testimony and objective information about the effects of congestion on freight-related businesses and the businesses they serve.
Marine Drive Stakeholder Group	Every 3 weeks	The MDSG advises the Columbia River Crossing project on designs to improve the safety and traffic operations of the Marine Drive interchange. The group provides feedback on the function and design of three interchange designs being considered by the project.
Pedestrian and Bicycle Advisory Committee	Monthly	The PBAC was established to guide the development of improvements for people who walk or ride bicycles in or through the project area. The committee brings together 25 community members and agency representatives to develop recommendations to enhance facilities and connections for pedestrian and bicycle circulation.
Urban Design Advisory Group	Monthly	The UDAG advises CRC on the appearance and design of bridge, transit and highway improvements.
Vancouver Working Group	Every 2 weeks	The VWG is made up of community members (residents, business owners, transit-dependent populations and commuters) who have an interest in light rail planning in Vancouver. The VWG will meet regularly to develop recommendations and provide feedback to the Columbia River Crossing project, the City of Vancouver and C-TRAN on a preferred transit alignment, proposed station locations and design, security, and park-and-ride facilities.
Portland Working Group	TBD	The Portland Working Group will function in much the same way as VWG, however, its focus will be associated with Portland Area Transit-related improvements.

Public Coordination

Public coordination is typically handled by the CRC Communications Team. However, technical staff is always available to speak to the public should there be a need. All public coordination efforts for the CRC are listed in Section 2.7.

Utility Coordination

Utility coordination during design development is the responsibility of the Utility Engineering Lead reporting to the Highway Manager. The utility engineer is responsible for ensuring all utilities are located. This work effort requires extensive research into as-constructed plans. It also requires coordination with the Survey Manager and with all known utility companies and agencies within the BIA. The Utility Engineering Lead will review all design plans for early identification of potential utility impacts. Since 2005, CRC has worked with the jurisdictional agencies and utility companies to produce an extensive map for the utility network with in the BIA. The following is a listing of all known utility companies within the BIA:

- AT&T
- Chevron
- Clark Public Utilities
- Comcast
- Electric Lightwave
- Level 3 Communications
- MCI
- NW Natural
- Pacific Power & Light
- Portland General Electric
- Qwest
- Sawtooth Technologies
- Sprint
- Time Warner Telecom
- Verizon
- BNSF

CRC Interdisciplinary Coordination

Project Development Team (PDT) meetings are the primary means for internal interdisciplinary coordination at CRC. PDT meetings occur every other week and include Managers and Task Leads from every discipline at CRC. PDT meetings typically cover scope, schedule, and budgetary issues facing each discipline, upcoming deliverables, and upcoming coordination meetings, followed by status updates from each discipline on specific issues. Mini-PDT and Bridge/Highway/Traffic meetings occur as needed, to cover interdisciplinary coordination issues in additional detail, or to follow up on action items from the PDT meetings. All meetings are facilitated and organized by the Consultant Project or Deputy Project Manager.

4.3.3.2 Design Documentation

WSDOT has an extensive design documentation process. The WSDOT Design Documentation Checklist will be utilized to identify all documents necessary for records retention requirements. The Design Documentation Checklist categorizes documentation into two categories Project File (PF) and Design Documentation Package (DDP). PF documents are retained by CRC for at least three years after construction is completed. DDP documents are retained at the DOT Headquarters Office for at least 75 years after construction is completed. As the checklist references specific documentation and terminology used by WSDOT, a comparable document listing will be adapted for design using ODOT design manuals. The Consultant Task Leads will be responsible for properly categorizing documents as PF or DDP prior to transmitting to Document Control.

4.3.3.3 Design Review and Approval Processes

ODOT and WSDOT both have traditional review and/or approval processes that dictate at what points FHWA reviews and/or approval is needed. The following sub-sections list the specific approvals and documentation needed for those approvals.

Design Approvals

Design Approval/Acceptance Process (DAP)

WSDOT and ODOT have initial design approval processes for both internal technical staff and from FHWA approvals. While the agencies have different naming conventions for this process, they are essentially the same process. CRC will provide the following documents for DAP:

- A one- or two-page reader-friendly memo that describes the project
- Project Summary documents
- Corridor or project analysis
- Design Criteria worksheets
- Design Variances Inventory (for known variances)
- Channelization plans, Intersection plans, or Interchange plans (if applicable)

- Alignment plans and profiles (if project significantly modifies either the existing vertical or horizontal alignment)
- Current cost estimate with a confidence level
- Design Approval/Acceptance is valid for three years. During that time updates to design standards are not required to be incorporated in the project. However, CRC will evaluate the potential benefits of any design standard changes for potential incorporation into the project.

Project Development Approval (PDA)

PDA is an interim approval process typically occurring between 60 and 90 percent design. The PDA process involves submitting a Draft Design Documentation Package to DOT technical staff and FHWA for approval. The following items must be finalized and approved for PDA:

- Required environmental documents
- Design Approval documents
- Design Variance Inventory
- Cost estimate
- Stamped cover sheet

Final PS&E Approval

A final review and approval of all contract bid documents is needed prior to advertising the project.

Constructability Reviews

Constructability reviews will be conducted at periodic intervals during design development. This is detailed further in Section 2.4.5.

PS&E Reviews

PS&E Reviews are typical practice for Highway and Bridge design projects. PS&E reviews typically occur during the following stages in the design development process:

- Initial Design
- 60% Design
- 90% Design
- 100% Design
- The PS&E reviews are provided to all CRC partnering agencies for comment. Comments and responses will be logged in a tracking form.

4.3.4 Design Control and Reporting

Reporting for the highway and bridge components of CRC will follow the reporting procedure detailed in Section 2.2.4.

4.4 Construction Program

FHWA, WSDOT, and ODOT have extensive construction management programs and experience in construction contract administration. It is likely that the CRC Construction Management needs will change depending on what is determined for contracting and procurement methods. The following sub-sections are placeholders for what could be developed further in Preliminary Engineering.

4.4.1 Construction Management

4.4.1.1 Highway and Bridge Managers

4.4.1.2 Construction Team Leader

4.4.1.3 Inspectors

4.4.1.4 Materials Laboratory

4.4.2 Construction Contract Administration

4.4.2.1 Bid Package

4.4.2.2 Advertisement

Pre-Bid Outreach

4.4.2.3 Bid Opening

4.4.2.4 Contract Award and Execution

4.4.3 Environmental Compliance

4.4.3.1 Best Management Practices

Planning

Monitoring

4.4.4 Utility Coordination

4.4.4.1 Utility Agreements

4.4.4.2 Utility Relocation

4.4.5 Submittals

4.4.6 Materials Testing

4.4.7 Change Order Process

4.4.8 Conflict Resolution and Claims Management

4.4.8.1 Dispute Review Board

4.4.9 Project Control and Reporting

4.4.9.1 Construction Schedule

4.4.10 Contract Closure

4.5 Maintenance and Operations

Future maintenance and operational considerations are important to a successful project. CRC is committed to providing a maintainable product. Coordination with the various jurisdictional maintenance authorities is necessary to ensure their ability to operate and maintain CRC after construction. The following sections will be detailed further during Preliminary Engineering.

4.5.1 Program Planning

4.5.1.1 Financial Planning

4.5.1.2 Maintenance Agreements

In some cases adjacent jurisdictional agencies may be better suited to accept responsibility for maintaining a particular facility. For example, WSDOT typically maintains bridge facilities for local agencies that lack the staff and expertise in bridge inspection and maintenance. In cases like this, interagency agreements detailing responsibility and potential compensation will be needed.

CRC Agreements Engineer will work with the various Task Leads on development and execution of interagency maintenance agreements. This section will be detailed further as identification of these issues arise through the Preliminary and Final design.

4.5.2 Roadway Maintenance

4.5.3 Stormwater Maintenance

4.5.3.1 Monitoring Program

4.5.4 Bridge Maintenance

4.5.4.1 Bridge Inspection Program

4.5.5 Traffic Management and Operations

The highway and bridge work will be constructed and operated in accordance with standards promulgated by the FHWA, ODOT, WSDOT, and other accepted practices.

During the Final Design phase a detailed plan will be created that will address the following:

- Maintenance of Traffic (MOT) standards
- Roles and responsibilities of the traffic management staff
- Review of MOT plans and proposals at various design reviews, for conformance with approved standards and familiarity with traffic phasing, traffic shifts, and lane closures proposed during construction
- Coordination with local agencies during design and construction regarding placements of temporary signing and traffic control devices within their jurisdictions
- Coordination with local agencies during design and construction regarding restrictions and management of special events
- Coordination with all local emergency agencies during design and construction, to ensure adequate passage of emergency vehicles through the construction zones
- Coordination of traffic maintenance among multiple contractors, in order to integrate temporary signing and traffic control devices among various contracts
- Conducting periodic MOT reviews during construction (including nighttime inspections), for conformance with plans, specifications, and approved standards; and to ensure that all traffic control devices are functioning properly
- Incident management plans for accidents occurring within the CRC limits, including accident prevention strategies, emergency procedures, reporting requirements, and mitigation strategies
- Coordinating and assisting the Media and Public Information team and local news media concerning traffic pattern changes, periods of lane closures, traffic delays, alternate routes available, work zone accidents, etc.
- Level and frequency of audit and oversight traffic management reviews to be performed by the ODOT, WSDOT, FHWA, independent consultants, and/or other agencies
- Traffic management monthly reporting

4.5.6 Facility Safety and Security

The highway and bridge work will be constructed and operated in accordance with the standards of the Federal Government (DOT/FHWA, and DHS/TSA), ODOT, WSDOT, and other accepted practices.

During the Preliminary Engineering a Draft Safety and Security Plan will be created including the following:

- Safety and health standards

- Roles and responsibilities of the safety/security staff
- Contractors requirements
- Threat and vulnerability assessments

The Safety and Security Plan will be refined during Final Design, based on information from the threat and vulnerability assessments.

Appendix A

Resumes

This page left blank intentionally.

Michelle Alexander, PE
Transportation Engineer
2002-present

While at DEA my job duties have included leading or assisting with data collection efforts, intersection analysis, parking studies, transportation corridor projects, traffic impacts studies, and documentation of technical results. I am familiar with various transportation software packages including VISSIM, Synchro/Simtraffic, Traffix, HCS, and Microstation. More recently, I have also been communicating and presenting technical information to clients and the public.

Professional Experience:

ITC Corvallis, OR **6/01 to 5/02**
Intern

Entry level traffic analysis utilizing the VISSIM simulation software. Minimum exposure to crash analysis, design elements, and transit considerations.

JRH Transportation Engineering Eugene, OR **6/00 to 3/01**
Intern

Entry level traffic analysis utilizing the Synchro/Simtraffic and HCS software packages. Duties include collecting traffic count, parking, and stadium origin/destination and occupancy/duration data. Data collection was followed by analysis and documentation.

Hamilton Construction Company Springfield, OR **6/97 to 3/00**
Main Office staff and Site Job Office Manager

Main Office staff job duties included run and gets, cataloging/check out/maintenance of equipment, mileage reports, and safety Material Safety Data sheets (MSDS) for hazardous materials. Site Job Office Manager duties included run and gets, processing of hours worked by staff, logging and processing Purchase Orders, coordinating material shipments, and calculating “take-offs” to order materials.

Education:

Oregon State University Corvallis, OR
BS, BA, MS-Civil Engineering

Accreditations:
Professional Engineer, OR
Women’s Transportation Seminar

Josh Anderson, E.I.T.
Traffic Analyst
2006-present

Macro and micro level simulation experience with an emphasis in LOS and capacity studies.

Professional Experience:

Kittelson and Associates, Inc., Portland, Oregon **6/2005 to 8/2005**
Traffic Analyst

Macro and micro level simulation experience with an emphasis in LOS and capacity studies.

Education:

The University of Arizona, Tucson, Arizona
BS in Civil Engineering

Accreditations:
Engineer in Training

T. Brent Baker
Principal Consultant, PB
2006 – Present

Brent Baker is a Principal Consultant and certified Senior Project Manager specializing in transportation project finance, toll revenue forecasting, travel demand estimation, benefit-cost evaluation, and funding analyses. Brent serves as PB's northwest expert in modeling economic impacts and evaluating the financial feasibility of infrastructure projects. His technical, advisory and management experience covers highway, ferry, rail, and transit projects, and includes value pricing/toll revenue forecasting, travel surveys, economic feasibility studies, tariff elasticity analyses, financial model development and application, statistical modeling, and funding studies.

Professional Experience:

Brent has been with PB since 1990, where he has managed or conducted economic and financial analysis for transportation infrastructure projects locally, nationally and internationally. He has been an integral part of the CRC finance team since the current environmental effort got underway in 2005. His experience with PB includes:

WSDOT Owner, Seattle, Washington **2003-Present**
Financial and toll feasibility analysis; SR 520 Corridor Program

Consultant project manager for the 2004 Toll Feasibility Study and the 2007 and 2008 SR 520 Finance Plans; led the effort to develop and update a financial plans for the SR 520 bridge crossing of Lake Washington. Managed the preparation of detailed toll traffic and revenue projections as well as toll collection O&M cost estimates for several toll scenarios involving SR 520 and the parallel I-90 lake crossing; provided supporting financial analysis and toll funding projections.

San Francisco County Transportation Authority Owner, San Francisco, CA **2006 to 2007**
Doyle Drive Toll Feasibility Study

Project manager for this toll feasibility study predict toll traffic and revenue under various toll scenarios and collection schemes and to assess the potential funding contribution of tolls under different financing structures and delivery methods, including conventional design-bid-build with publically issued debt and private financing with debt and equity under a design-build-operate and maintain concession agreement.

Sound Transit Owner, Seattle, Washington **2005 to 2008**
Financial Planning and Analysis for the Sound Transit 2 Plan

Led the consultant-provided financial analysis and modeling that supported the Board adoption and passage of Proposition 1 in 2008 to implement a $13.5 billion capital expansion program of rail and bus investments in three counties. Developed financial analysis tools and facilitated interactive financial modeling planning sessions with Sound Transit staff to conduct real-time feasibility analysis of potential packages of program elements. Managed the consultant effort to rebuild the agency's financial model for projecting future operations and capital financing according to industry standard financial modeling practices. Led the methodology development and application of an economic benefit-cost analysis of the program's rail investments.

WSDOT, Seattle, Washington **1991 to present**
Washington State Ferries Econometric Modeling and Revenue Forecasting

Project manager for this ongoing engagement to regularly prepare ridership and revenue forecasts by route for six fare categories for the nations largest ferry system. Led the development of the econometric demand forecast models designed to estimate fare elasticities; analyzed the impacts of alternative tariff policies and service levels.

Education:

University of Washington, Seattle, Washington
M.A. Economics, 1990

Whitman College, Walla Walla, Washington
B.A. *cum laude* Economics/Math Minor, 1986

Cecil R. Barker
CADD Systems Manager
2006 to Present

Manages CAE Systems on Bi-State mega-project. Develops, implements, and assures CADD standards. Provides professional technical CAE File Management and Coordination to the Columbia River Crossing (CRC) Team.

Professional Experience:

WSDOT **11/03 to 06/06**
Region CADD Coordinator

Help establish and maintain statewide CAE standards , including drafting standards, file content standards, project file-naming standards, and project file maintenance. Provide training, assistance, and guidance to region's CADD users.

WSDOT **10/99 to 11/03**
Draftsman - Plans Preparation

Regional Lead CADD user. Assist in preparation of design summaries, contract plans, addendums, and change orders, visual displays and exhibits. Hardware/software beta tester for region IT department.

WSDOT **07/93 to 10/99**
Region Access Engineer

Received applications, researched, analyzed, and made recommendations to issue various types of permits. Maintained regional right-of-way maps, documenting permits, franchises, turnbacks, relinquishments, and annexations. Responsible for maintaining inventory database of the region's access and general permits.

Education:

Central Valley High, Spokane, WA.
High School Degree - 1975

Faith E. Baum
Illumination Arts LLC
Principal
2004-present

With over twenty years in architectural lighting design and several years as a theatrical lighting designer, Faith Baum brings a passion and understanding of light to her roles as principal and founder of Illumination Arts. Some noteworthy projects in her portfolio include Veteran's Glass City Skyway in Toledo, Four Bears Bridge in North Dakota, Lowry Avenue Bridge in Minneapolis and Cypress Avenue Bridge in Redding, California.

Excellent at explaining the ephemeral qualities of lighting design to a lay audience, Faith has participated in many public design charettes. She has been a speaker at the International Bridge Conference, NeoCon World's Trade Fair, and Busch Entertainment Annual Meeting, and has taught workshops and participated in panel discussions organized by various industry organizations.

In her many roles at Illumination Arts, Faith acts as project manager, lead designer and client contact on a wide variety of project types.

Professional Experience:

The Mintz Lighting Group, Newark, New Jersey **1994 to 2004**
Located in New York City through 2001
Vice President/Associate Principal

Responsibilities included design, client relations, internal company management and business development.

The Mintz Lighting Group, New York, New York **1989 to 1994**
Associate

Responsibilities included design, client relations and management.

The Mintz Lighting Group, New York, New York **1984 to 1989**
Designer

Responsibilities included design and client contact.

Freelance Theatrical Lighting Design **1977 to 1984**
Designer

Designed lighting for theatrical productions, including work at the Henry Street Playhouse in New York and the New Jersey Shakespeare Festival.

Education:

New York University, New York, New York
Bachelor of Arts

Parsons School of Design, New York, New York
Coursework in Architectural Lighting

Polakov Studio of Stage Design, New York, New York
Theater Lighting Program

Accreditations:

- LEED Accredited Professional by the U.S. Green Building Council
- International Association of Lighting Designers (IALD) Professional Member
- Lighting Certified (LC) by the National Council for the Qualifications of Lighting Professionals

Andrew J. Beagle, E.I.T
Highway and Stormwater Design Task Lead
2008-present

Responsible for quality assurance, oversight, and agency coordination of the stormwater planning and design for CRC. Monitor consultant scope, schedule and budget. Responsible for ensuring proper documentation and adherence to standards; representing both WSDOT and ODOT.

Professional Experience:

WSDOT, Vancouver, WA **2006 to 2008**
Transportation Engineer 3

Tasked to develop a consultant management office for WSDOT Southwest Region, including all planning necessary to operate and maintain a design project office. Responsible for project and consultant management of multi-phased improvements on Interstate 205. As well as the project development and management of an internal design team to deliver four roadway preservation projects, two bridge replacement projects, and one minor improvement project on Interstate, National Highway System, and State routes. Additionally, co-facilitated one VE study and participated on three VE studies as a team member. Presented new methodology for low-cost VE Studies aimed to improve coordination with resource agencies at the 2007 AASHTO Value Engineering Conference. Team Member to improve WSDOT's Lesson's Learn database. Transferred in 2008, served as WSDOT SW Program Development Engineer. Responsible for coordinating the development and definition of projects in the Improvement and Preservation programs with region and HQ staff. The position is responsible for incorporating the final list of projects into the Capital Program Management System (CPMS). The position is also responsible for reporting project scope, schedule, and budget changes using the latest change management processes and ensuring project scope correlates appropriately with funding sources.

WSDOT, Vancouver, WA **2005 to 2006**
Transportation Engineer 2

Responsible for the continued project development of eight bridge preservation projects, two rockfall prevention projects, and one emergency bridge repair project on the National Highway System and State routes. Responsible developing and monitoring PMP, schedules, scope, budget, estimate, plans, specifications and all other documentation required to deliver projects from conceptual scope through contract advertisement. Responsible for monitoring the day to day operations design development including coordinating with resource specialists, resource agencies, local agencies, tribal governments, utility companies, the National Forest Service, the National Park Service and others. WSDOT Design Liaison for the Vancouver Land Bridge. Served as a VE study member on four state and/or county VE studies.

WSDOT, Vancouver, WA **2004 to 2005**
Transportation Engineer 1

Responsible for the project development for eight bridge preservation projects and one mobility improvement project on the National Highway Systems and State routes. Responsible producing and monitoring PMP, schedules, scope, budget, estimate, plans, specifications and all other documentation required to deliver projects from conceptual scope through contract advertisement. Responsible for monitoring the day to day operations design development including coordinating with resource specialists, resource agencies, local agencies, tribal governments, utility companies, the National Forest Service, and others. Additionally work as construction inspector on one roadway preservation project.

Education:

University of Portland, Portland, OR
B.S. Civil Engineering, 2003

Accreditations:
EIT**:** 72512EIT (Oregon State Board of Examiners for Engineering and Land Surveying)

Jordan Becker
Design Engineer in Training
2008-present

Responsible for roadway design and modeling in compliance with applicable design standards using CADD software. Coordinates design work with other disciplines and provides data to them as requested. Also assists in the development and preparation of sheet files and exhibits.

Professional Experience:

David Evans and Associates, Vancouver, WA **6/07 to 9/07**
Civil Engineering Intern

Working at the CRC project office with the Highway Engineering group, created basic roadway alignments and conceptual pedestrian feature designs using CADD software. Produced meeting summaries, exhibits for the Highway and Transit disciplines, and assisted in file quality control.

Education:

University of Washington, Seattle, WA
Bachelor of Science in Civil Engineering, 2008

Accreditations:
Engineer in Training, WA License No. 28454

Thomas Becker
Cultural Resources Manager
2009-present

As the Cultural Resources Manager, I work with consultants and agencies, overseeing the completion of the cultural resources technical reports, the development of a Memorandum of Agreement and associated Archaeological Treatment Plan and Monitoring Plan, and to coordinate between consultants and CRC staff to ensure that CRC is in compliance with cultural resource regulations.

Professional Experience:

Applied Archaeological Research, Inc., Portland, Oregon **7/03 to present**
Project Archaeologist

Lead and manage projects from start to finish, including background research, fieldwork, working with technical specialists, and writing and incorporating data into the technical report.

Historical Research Associates, Inc., Seattle, WA **10/02 to 7/03**
Archaeologist

Assist project leads with fieldwork, background research, report writing, management plans, and other project work.

Portland State University, Portland, OR **Summers 2001and 2002**
Field School Director

Assisted National Park Service archaeologists in teaching archaeological field methods to students.

Education:

Portland State University, Portland Oregon
2004 M.A. Anthropology

Linfield College, McMinville, Oregon
1994 B.A. Anthropology

Register of Professional Archaeologists	2008-present
Society for American Archaeology	2007-present
Association for Washington Archaeology	2004-present
Association of Oregon Archaeologists	2001-present

Cara Belcher, P.E.
Consultant Civil Engineer
2005 – Present

As a member of the highway design team Cara develops roadway designs including conceptual plans, construction staging concepts, and associated estimates in support of the Columbia River Crossing Project EIS. She also works with the State DOTs to document design decisions and provides technical support to project advisory committees.

Professional Experience:

Cara came to the engineering field in 2002 with 5 years experience as a Project Engineer in construction management. During her time in design engineering with Parsons Brinckerhoff she has been involved in several transportation projects and has gained experience in geometric design, stormwater management, plan & specification preparation, and cost estimate development. Cara's working knowledge of computer-aided design and drafting (CADD) is very strong and includes experience with AutoCAD, AutoCAD Civil 3D Microstation, and InRoads.

PB Americas, Inc. **2003 to present**

Sample Project Experience, Engineering
- ***Eastside Combined Sewer Overflow, City of Portland Bureau of Environmental Services.***
  The Eastside CSO project is the largest of Portland's projects to reduce sewer overflows to the Willamette River. Involved in the coordination and development of the project specifications.
- ***SR-432 Interchange, Cowlitz-Wahkiakum Council of Governments***.
  Responsible for the geometric design and preliminary stormwater analysis supporting the Documented Categorical Exclusion. The project proposed to retrofit two closely spaced interchanges that connect Washington State Route 432 with Interstate 5 and Talley Way. Improvements included revised horizontal and vertical alignments and the addition of braided ramps to improve operational deficiencies.
- ***Ridgefield Capital Facilities Plan, City of Ridgefield Washington.***
  Responsible for engineering support of this transportation planning project. Involvement included site evaluation, development of preliminary alignments, and corresponding cost estimates.
- ***SR-502 Interchange, Washington State Department of Transportation.***
  The project added a new connection from I-5 to SR-502. Involvement included conceptual and preliminary engineering supporting the Environmental Assessment. This work included development of horizontal & vertical alignments and preliminary hydrology and hydraulic analysis.

Sample Project Experience, Construction Management
- ***Clark County Campus Development – Vancouver, WA***
  New construction of a 144,800 sf three-story post tensioned parking structure and six-story 145,000 sf structural steel office building
- ***VERIO, Inc. – Portland, OR***
  Construction of 30,000 sf data center including creation of office space, structural upgrades, and installation of al mechanical and electrical systems
- ***PDX Central Utility Plant Expansion – Portland, OR***
  Addition and seismic upgrade to existing plant with expansion of mechanical and electrical systems that serve the airport terminal

Education:

Portland State University, Portland, Oregon
B.S. Civil Engineering, 2002

Oregon State University, Corvallis, Oregon
B.S. Construction Engineering Management with a Minor in Business Administration, 1997

Accreditations:
Professional Engineer in Washington and Oregon

Katy Belokonny
Community Involvement Coordinator
2008-present

Katy is an integral part of C-TRAN's Development and Public Affairs Department and represents C-TRAN in her integration with the Columbia River Crossing Communications team. Her position involves the coordination and execution of all community involvement activities related to the Vancouver-area. Work includes planning, scheduling, organizing, and implementing community outreach and public involvement activities necessary to provide information regarding CRC planning to a variety of audiences.

Professional Experience:

WHPacific, Portland, Oregon **6/07 to 9/08**
Marketing Coordinator

Prepared numerous competitive proposals for WHPacific's Civil Engineering, Landscape Architecture, and Surveying Business Lines. Also experienced in completing SF 330/SF 254-255 forms. Performed writing, extensive proof-reading and editing, page layout with graphics, and tracking proposal leads. Coordinated with multiple parties internally, as well as externally, to generate new projects. Planned, organized, and hosted a 500-person open house. Provided a high-level of attention to details and successfully managed multiple proposal and media deadlines. Responsible for writing and obtaining publishing for press releases. Scheduled and attended numerous proposal debriefs. Prepared project teams for interviews and presentations.

ARCHITECTS Barrentine.Bates.Lee, Lake Oswego, Oregon **1/06 to 6/07**
Marketing Coordinator

Developed extensive technical and graphically sophisticated proposals for ARCHITECTS Barrentine.Bates.Lee in an attempt to secure continual work for the firm. Created material for presentations such as story boards, handouts, power point presentations and videos. Prepared partners and colleagues for interview. Hired photographers to capture finished work and attended photo-shoots. Launched an 11-month post-card campaign featuring the firm's recent high-profile projects. Created market specific brochures focusing on interior design and unconventional components of architecture. Wrote press releases and contacted media outlets to generate on-going working relations.

Godwin Olson, Battle Ground, Washington **6/05 to 1/06**
Public Relations Account Executive

Became a vital asset to Godwin Olson in a time of tremendous company growth. Worked with various clients ranging from architecture and engineering firms to non-profit organizations. Designed electronic newsletters, wrote articles and promotional pieces, generated media coverage, edited communications plans, and proof-read copy. Updated all marketing material for large corporate firm. Planned and managed fund raising activities for non-profit organizations, such as private schools and fair-trade coffee suppliers, including a golf-tournament, auction, and donor letters. Managed spreadsheets and financial database of non-profits and solicited donations.

Education:

Washington State University, Pullman, Washington
B.A. Public Relations, 2005

Kelly Betteridge
Transit Planner Lead
2008-present

As the Transit Planner Lead, Kelly is responsible for the day-to-day management of the transit planning efforts including the transit portion of the FEIS and the New Starts update.

Professional Experience:

Kelly has worked in the transportation industry for nearly a decade. Her experience ranges from outreach and management of an agency wide Transportation Demand Management program to development of multi-million dollar proposals for transportation infrastructure pursuits.

TriMet, Portland, OR **2005 to 2008**
Transportation Programs Coordinator

Program manager for agency's Transportation Demand Management activities. Worked with over 400 area employers and colleges to develop transportation programs to minimize single occupancy vehicle trips.

University of Minnesota State and Local Policy Program, Minneapolis, MN **2003-2005**
Graduate Assistant

Aided in the development of an FTA funded study entitled, "Keys to Corridor Planning: Best Practices Framework for Successful Urban Transportation Corridor Projects." Led research and completed drafts for both the economic development and governance portions of the study.

Parsons Brinckerhoff, Portland, OR **2000 to 2003**
Marketing Coordinator

Led major transportation infrastructures pursuits from teaming through proposal development and interviews. Managed and authored multiple active pursuits while tracking potential projects from legislation through planning activities.

Booz Allen Hamilton, San Francisco, CA **1999 to 2000**
Consultant

Worked on the TransLink project, aiding in the development of a shared Smart Card fare system for 26 transit agencies in the San Francisco Bay Area. Assisted in agency outreach as well as development of a system structure.

Education:

University of Minnesota, Minneapolis, Minnesota
Master of Urban and Regional Planning (MURP), 2005

University of Oregon, Eugene, Oregon
BA/BS Business Administration, 1999

Audri Bomar
Communications and Public Involvement Associate
2006-present

Audri supports the communications and public involvement activities for the Columbia River Crossing project by coordinating the outreach schedule and conducting community outreach. She implements and executes the communication plan through production of meeting materials, coordinating with project partners and interested neighborhoods, and planning and attending open houses, workshops, advisory group meetings and community festivals. Audri manages the tracking system for large amounts of information and is responsible for reporting public engagement progress and needs.

Professional Experience:

Riverview Community Bank, Vancouver, WA **10/05 to 5/06**
Customer Service Representative/Teller

Processed bank transactions, provided loan information, promoted bank products, and responded to customer needs. Maintained detailed and accurate logs of all transactions and balanced cash drawers daily.

City of Portland, Portland , OR **5/04 to 11/05**
Vegetation Mapping Project

Assisted in the production of the City of Portland's Bureau of Planning Vegetation Mapping Project. Responsible for mapping over 30,000 acres of vegetation using ArcGIS 9.0 and 10 and high resolution aerial photographs. Confirmed data using Arc Pad and digital images. Served on a team that finalized the database of vegetation resources as part of the Oregon Land-use Planning Goals.

Pacific University, Forest Grove, OR **5/03 to 6/04**
Career Development Center Project Coordinator

Implemented the Career Development Opportunities for Students program, which provided students with monthly classes on topics that would teach them skills to help prepare them for the workforce. Implementation of the program involved surveying students, staff and faculty to identify development needs, organizing campus trainings including scheduling, booking locations, advertising/promotion, and recruiting trainers. Conducted two of the trainings on PowerPoint and Excel in the Workplace and Professionalism in the Workplace

Education:

Pacific University, Forest Grove, Oregon
B.S. Environmental Biology, 2005

Volunteer Experience:

Oregon White Oak Restoration Project Coordinator: Planned logistics, recruited volunteers, advertised the project, acquired supplies, participated in grant application process, briefed the City of Forest Grove city council drafted implementation plan, and executed volunteer tree planting event

Salmon Creek Watershed Council: Staffed information booths at local community events. Assisted in logistical planning and advertising for Salmonpeople theater event, a fundraising and education event for the organization and community.

Students for Environmental Awareness: Staffed information booths, planned the 2005 Earth Day Festival, raised campus awareness through posters and articles in campus publications, increased club membership and participation

Matthew G. Bone, E.I.T.
Consultant Highway Engineering
2006-present

Matthew develops roadway designs including conceptual plans, construction staging concepts, and associated estimates as a member of the highway design team for the Columbia River Crossing Project in support of the EIS. He also works with the State DOTs to document design decisions and provides technical support to project advisory committees.

Professional Experience:

David Evans and Associates, Inc., Portland, Oregon **2006 to present**
Designer, Engineer in Training

Highway designer for the Columbia River Crossing Project. Develops roadway design, quantity estimates, documents design decisions and provides technical support to project advisory committees.

ODOT, Salem, Oregon **5/06 to 8/06**
Intern Inspector/Surveyor

Inspector for two public works projects around the Salem area; Rickreall Interchange and OR221 Salem-Dayton. Performed quality control for both projects and developed daily reports and paynotes.

Surveyed at Rickreall Interchange as well as at the Santiam Pass. Modeled existing grade to calculate fill requirements and performed forensic analysis of landslides. Staked out driveways, drainage, right of way and set bluetops for grade control.

Education:

Oregon State University, Corvallis, Oregon
B.S. Civil Engineering, 2006

Accreditations:
Engineer in Training

Sandy Bradley
Program Management Director, TriMet
1991-present

Director, Program Management:

Responsible for professional staff managing cost control, estimating, project integration, , risk management, scheduling and database development and administration of major capital projects. Respond to and coordinate requests from FTA. Prepare and manage Full Funding Grant Agreement requirements.

Prepare annual grant amendments; track grant budget. Prepare, monitor and manage division's annual operating and capital budgets. Analyze variances, suggest and implement recovery strategies. Assist in development of agency capital budget. Coordinate division activities with finance and administration. Develop and manage division operating budget.

Professional Experience:

TriMet, Portland, OR **1991 to 1998**
Westside MAX Light Rail Project
Financial Management Analyst

Responsible for budget oversight, cost tracking, analysis and cost projections for $963 million light rail project. Prepared semi-annual cost to complete report ("bottom-upforecast of final cost of project). Prepared annual grant budget and amendments as necessary. Determined eligibility of costs for grant funding.

Metro, Portland, OR **1986 to 1991**
Oregon Convention Center Project

Responsible for budget, cost tracking, analysis, review and reporting for $85million project to build the Oregon Convention Center. Served as staff to Citizen Advisory Committee on Design and Construction.

Multnomah County, Oregon **1976 to 1986**

Justice Center Project Transition Team:
Responsible for staffing, budget, and work plan to close old Rocky Butte Jail and open new downtown detention center in the Justice Center.

Sheriff's Office:
Designed, developed and implemented the first rape prevention program. Analyzed proposed legislation for possible impact on law enforcement. Annual operating budget team.

Education:

International Graduate School, Stockholm, Sweden
Certificate 1974

Harvard University, Cambridge, Massachusetts
Bachelor of Arts in Government *cum laude* 1973

Richard Brandman
ODOT Project Director
2008-present

Professional Experience:

Oregon Department of Transportation, Vancouver, WA **10/2008 to Present**
Highway Division/Columbia River Crossing Project

Mr. Brandman is responsible for directing all aspects of the Columbia River Crossing Project (CRC) on behalf of ODOT. CRC is the agency's largest and most complex project and is of critical importance to the Portland region, the state and the nation. In this position, he exercises principal decision-making authority for daily work activities and the development of policies and priorities of the CRC Project on behalf of ODOT.

He provides overall vision and guidance for the CRC Project and represents the agency with elected and appointed officials at the local, regional, state and federal level. This position is responsible to the ODOT Director.

Metro, Portland, OR **1989 to 2008**
Deputy Planning Director

In his prior position with Metro, Portland's regional government, Mr. Brandman was responsible for directing all planning and environmental work required to advance Portland's acclaimed light rail and streetcar system through the Federal Transit Administration's (FTA's) New Starts ratings process. He served in this capacity for every project since the Westside Light Rail Project entered project development in 1989.

In addition to his project development activities, Mr. Brandman's responsibilities included the development of federal and local revenue strategies to fund the rail projects. He also played a major role in creating a strong MPO that has been recognized throughout the country for its ability to forge a consensus on major transportation initiatives and coordinate transportation and land-use policies.

Education:

University of Maryland, College Park, Maryland
Graduated 1972, with high honors, B.A. Economics

Fred Bullen
CRC Project Scheduler
2008 – Present

Responsible for creating and maintaining integrated CRC Project Schedules.

Professional Experience:

Parsons Brinckerhoff, Vancouver/Olympia, WA **3/08 to 10/08**
SPMG Project Controls Specialist - WSDOT consultant position

- Maintained an integrated SPMG (Statewide Program Management Group) schedule
- Re-baselined and maintained the PMRS (Project Management & Reporting System) schedule
- Developed schedule templates

Parsons Brinckerhoff, Vancouver, WA **6/06 to 3/08**
SPMG Tier 3 Consultant - WSDOT consultant position

- Reviewed contractor baseline and update schedules
- Reviewed contractor time and cost impact proposals, and developed counter proposals
- Developed preconstruction schedules
- Constructability and state specification reviews

PMA Consultants, Braintree, MA **9/03 to 6/06**
Senior Engineer II

- Reviewed and updated high rise hotel and high school project schedules (1/06-6/06)
- Performed various tasks as a schedule & cost engineer (MTA sub-consultant position under Bechtel/Parsons Brinckerhoff) for the $190 Million I90/I93 Central Artery Interchange Project. Various tasks included time impact reviews, counter claim proposals & negotiations, cost & schedule progress reporting, schedule analysis, integrated project schedule updates, detailed milestone completion list preparation & updates, contract quantity evaluations (over/under-runs) and earned value management (1/05-2/06)
- Prepared university expansion project schedules, evaluated time impacts for power plant, water treatment plant and transportation projects, and prepared estimates and reviewed construction sequencing for a $1.1 billion water treatment plant (9/03-1/05)

Peter Kiewit & Sons, Boston, MA **1/03 to 6/03**
Project Coordinator, $95 million Central Artery Electrical Project

- Re-baselined the project schedule and enhanced payment procedures
- Managed the scheduling team

Peter Kiewit & Sons, Omaha, NE **12/00 to 1/03**
Claims Avoidance Engineer

- Prepared and analysed construction schedules and time impact and cost proposals for projects throughout the US totalling $1.6 billion on various project types that include bridges, roads, piers, dams, airports, power plants, water treatment plants, waste water treatment plants, pump stations, communications, elevated rail and tunnels
- Trained new and experienced schedulers and claims avoidance personnel

Various Contractors, US and Canada **6/95 to 12/00**

Kiewit – Field Manager, Field Engineer and Estimator for $2 billion communication project, eastern US
Neosho – Project Engineer for $14 million paving project, Concordia, KS
Neosho – Project Engineer for $44 million design build Union Pacific intermodal facility, Marion, AR
Strait Crossing Inc. – Area/Field Engineer for $840 million, 8 mile, ice protected, precast concrete segmental bridge with 750’ spans, Borden-Carleton, PE

Education:

Memorial University of Newfoundland, St. John’s, NL
B.Eng (Bachelor of Engineering, Civil, Co-op), 1995

James W. Burke
Consultant Project CADD Manager
2005 – Present

Jim supports DOT's management and design teams by providing sketches, exhibits and plans, for public involvement, web applications, design charettes and workshops. He is responsible for the day-to-day management of the project's consultant CADD team. He has provided key input on file management, file naming, file archiving, and establishing/developing CADD standards for all disciplines.

Professional Experience:

Prior to the Columbia River Crossing project Jim was the CADD manager for PB of Portland.

PB Americas, Inc. **1998-present**

ODOT Design-Build Program **2004-2005**
Conceptual drawing for preliminary alignments and staging plans

Lead CADD for Mt. Hood to Chemult, Sutherlin to Roseburg projects. Responsible for developing conceptual alignment and staging plans.

WSDOT, King Clark and Cowlitz County **2003 to 2004**
Preliminary plans and alternative analysis.

Lead CADD for SR432, SR502 and Alaska Way Viaduct projects. Responsible for conceptual planning and preliminary design plans.

FHWA, Trinity County, California **2002 to 2003**
Mad River Road

Lead CADD for realignment of Mad River Road. Responsible for final design plans of new alignment and replacement of bridges and culverts.

ODOT **2001 to 2002**
Pioneer Mountain to Eddyville

Lead CADD for preliminary design on a new mountain pass alignment for Hwy 20. Responsible for CADD files and development of PE plans for Design/Build package.

TRI-MET, Portland, Oregon **1999 to 2000**
Interstate MAX Yellow Line

Lead CADD for prime consultant for light rail project from Rose Quarter to Expo Center. Responsible for file management, management of CADD staff and creation of

Level 3 communications, Washington, Oregon, California, Idaho **1998 to 1999**
One of the world's largest fiber optic internet providers.

Lead CADD for prime consultant for the initial segment of the fiber optic that ran from Sacramento to Seattle to Boise. Responsible for leading 12+ person team to final design drawings consisting of nearly 1300 miles of fiber optic routes.

Education:

ITT Technical Institute
A.A. Computer Aided Drafting/Design 1992

Cory Burlingame
Civil Engineer, EIT
2007-present

Cory Burlingame is a civil engineer with Parsons Brinkerhoff (PB), experienced in highway engineering, roadside design, drainage, rail grading, site grading, local street design, and pedestrian/bike paths from conceptual design thru post design. Cory's responsibilities have included managing project delivery, preparing project specifications and construction cost estimates.

Professional Experience:

Sound Transit D to M Street Project, Tacoma, WA **2008 to Present**
Civil Engineer, EIT

As civil engineer he was responsible for the conceptual design of a pedestrian at grade crossing and undercrossing. He is also responsible for the rail grading; assisting with the site grading; the horizontal and vertical alignments of retaining walls; site demolition. In addition, he is responsible for the contract specifications and construction cost estimate for the demolition and grading work.

ODOT I-84: Dodson – Tanner Creek – Bundle 209, Portland, OR **2007 to Present**
Civil Engineer, EIT

As civil engineer he is responsible for the design of the re-alignment of a two-lane principal arterial in conjunction with a bridge replacement over Moffett Creek. His responsibilities include designing and modeling the roadway horizontal and vertical realignment in conjunction with the horizontal and vertical alignments of the roadside ditches, the adjacent bio-swale, and retaining walls; designing roadside barriers and creating details; generating alignment, cross section and DTM surface reports for the contractor. He is also responsible for the contract specifications, construction cost estimate, coordinating and transferring deliverables to the client, coordinating the pre-bid assistance and managing the post design services.

ODOT I-5: Homestead to S Gold Hill – Bundle 313, Medford, OR **2007 to 2009**
Civil Engineer, EIT

As civil engineer he was responsible for the design and modeling of a new roadway alignment connecting to an interchange, and the design of a new multi-use path within the ROW; generating profiles and cross sections; designing roadside barriers and creating details; generating alignment, cross section and DTM surface reports for the contractor. In addition, he was responsible for the roadway specifications, construction cost estimate, coordinating and transferring deliverables to the client, and providing pre-bid assistance and the post design services.

BNSF/COV Waterfront Access Project, Vancouver, WA **2008 to 2009**
Civil Engineer, EIT

As civil engineer he was responsible for assisting in the design of the horizontal and vertical rail re-alignment, urban roadway horizontal and vertical realignment and utilities; generating retaining wall and rail profiles and cross sections; producing the City of Vancouver Proposal and Contract documents which includes the WSDOT, COV, and APWA special provisions. He was also responsible for coordinating the design with the rail, retaining wall, traffic, utility, street and landscaping design teams.

Education:

Portland State University, Portland, OR
Bachelor's of Science in Civil Engineering

Ashlee Carl, EIT
Design Engineer
2009-present

Current job duties include design support for consultant highway and hydraulic design teams and grant writing.

Professional Experience:

Washington State Department of Transportation, Kelso, WA **6/08 to 4/09**
Transportation Engineer 1

Lead designer for Roadside Safety Improvement Project: duties included creating plan set, summary of quantities, project estimate, project schedule and project documentation. Position also included construction site inspections.

David Evans & Associates, Portland, OR **5/07 to 8/07**
Engineering Summer Intern

Engineering summer intern for transportation office. Duties included creating cross section for roadways, vertical and horizontal curve calculations, construction material and budget estimates and plan set review development.

City of Richland, Richland, WA **5/06 to 8/06**
Engineering Summer Intern

Engineering summer intern for transportation office. Duties included construction site inspections and field verification and correction of as-built drawings.

Education:

University of Portland, Portland, OR
Bachelor of Science Degree in Civil Engineering, 2008

Accreditations:
Engineer in Training

Derek Chisholm, AICP
Senior Planner
2005-present

Derek is a senior land use and transportation planner with experience managing successful visioning projects, town center planning efforts, comprehensive plan updates, and historic preservation programs. He also manages corridor planning, transportation system planning, and transportation demand management projects, specializing in complex projects with intensive public involvement requirements. Since joining Parametrix, Derek has successfully managed studies for the northwest cities of Pendleton, Astoria, Beaverton, Hillsboro, Vancouver, and for the relocation of the Portland Saturday Market. With Parametrix, Derek has also completed urban development projects requiring proficiency with public housing, historic architecture, and urban design. Derek is an adjunct professor at Washington State University, and Chairs the Planning Commission in Vancouver, WA.

Professional Experience:

Clark County, Vancouver, WA **6/00 to 7/05**

Derek managed projects and programs with intergovernmental partnerships. He led both the historic preservation program and the Commute Trip Reduction Program which included participations from each of the cities in the County, major employers, and other stakeholders. Derek also led key projects focused on economic development, urban design, and Comprehensive Planning. For the Comprehensive Plan, Derek led the development of the Environmental Impact Statement, which was also a joint project with participation from each City in the County.

Greenville County, Greenville, SC **4/97 to 6/00**
Associate Planner

Derek led cultural and natural resource e planning associated with the Comprehensive Plan updates for Greenville County, the City of Greenville, and Fountain Inn SC. Derek managed the downtown revitalization in Fountain Inn, the Reedy River Corridor Plan, and the initiation of the Certified Local government Historic Preservation Program.

Department of Commerce, Asheville, NC **3/96 to 4/97**
Planner 1

Derek worked with the Division of Community Assistance, providing GIS, code writing and planning assistance to communities throughout western North Carolina

Education:

Covenant College, Chattanooga, TN
Bachelors of Organizational Management

Western Carolina University, Cullowhee, NC
Master of Public Affairs/ Environmental Planning,

Accreditations:
American Institute of Certified Planners (AICP) member
Accredited by National Charrette Institute

Neal Christensen
Sr. Transportation Project Manager/Deputy Project Manager
2010-present

Mr. Christensen is a senior transportation project manager with over 20 years of design and leadership experience with multi-disciplinary teams for transportation projects. He has extensive project management experience delivering projects from design through construction for numerous transportation agencies including WSDOT, ODOT, WFLHD, NYDOT, and ADOT as well as other local agencies. He has worked on roadway and freeway corridor projects in both urban and rural environments and is knowledgeable about the issues associated with improvements in tight corridors, including corridor alternatives analysis, property relocation, and public involvement. Mr. Christensen has managed projects requiring the development of Documented Categorical Exclusions (DCE) for WSDOT, including the current I-5 Widening: Mellen to Blakeslee project in Centralia, Washington. Mr. Christensen also has a strong background in providing construction engineering support, as well as schedule monitoring for transportation construction projects. He is familiar and has used the following scheduling software on numerous projects: Microsoft ™ Project, Primavera ™ (including Suretrack, P3 and P6) software

Professional Experience:

David Evans and Associates, Portland, OR **9/97 to present**

Recent Transportation Project Related Experience:

Project Manager, SR500/I-5 Interchange Improvement Project, Washington State Department of Transportation, Vancouver, Washington
Managing the overall multi-discipline consultant team including overall budgeting and scheduling. The project team is preparing the preliminary and final engineering construction documents for this fast track $150 million project which includes design of two new direct ramp connections between I-5 and SR 500.

Project Manager, I-5 widening from Mellen St. to Blakeslee Junction, Washington State Department of Transportation, Centralia, Washington
Responsible for the project team performing its duties in assisting WSDOT to prepare the environmental documentation and the preliminary engineering for the widening of I-5 in central Washington.

Project Manager, Highway 35 betterment project, Western Federal Highway Division, Hood River County, OR
Managing a team to design the $30 million highway reconstruction project on OR 35 at White River, Clark, and Newton Creeks. The project team is advancing the design from an intermediate design phase through the final plans, specification and estimate.

Project Manager, Juneau Access Highway Independent Cost Estimate, Western Federal Highway Division, Juneau , Alaska
Lead a team comprised of DEA staff and sub-consultants to prepare an independent construction cost estimate of the East Lynn Canal Highway also known as the Juneau Access Improvement Project near Juneau AK.

Engineering Task Manager, SR 432 Realignment Feasibility, for the Washington State Department of Transportation, Longview, Washington

Project Manager, Powers-Agness Highway Project, Western Federal Lands Highway Division, Powers, Oregon

Other Experience:

Kurahashi & Associates, Tigard OR; 1995 to 1997
Harza NE, Phoenix, AZ and Utica, NY; 1987 to 1995

Education:

Arizona State University
B.S., Civil Engineering, 1986,

Accreditations:
Professional Civil Engineer, Oregon (18961), 1997
Professional Civil Engineer, Washington (42591), 2006
Professional Civil Engineer, New York, (Inactive)

Jerremy Clark
Traffic Analyst
2007-present

Mr. Clark is an emergent engineer in training with six years of experience in the public, private, and academic sectors, a diverse background that provides him with a grasp on the interaction between various entities such as local, state, or federal governments and private consultants or clients. Mr. Clark has built upon his engineering duties in the military with a solid education and experience in land development. His research on driver needs and retroreflective traffic signing helped lay the groundwork for pivotal findings to shape the future of nighttime driving. His transportation education includes a background in operational analyses, planning, and design of transportation facilities and signalization. Mr. Clark plays a primary role in the documentation of many diverse projects as well as the traffic analysis, congestion mitigation, and design of transportation facilities.

Professional Experience:

Texas Transportation Institute, College Station, Texas **8/05 to 5/07**
Engineering Research Associate

Conducted and assisted in research involving human factors, traffic signs and markings, and transportation operations. Using advanced technology such as eye-tracking equipment, instrumented vehicles, and retroreflectivity measurement devices, designed and conducted a study to evaluate how the nighttime driver uses traffic signs.

Garrett Engineering, Bryan, Texas **1/05 to 8/05**
Project Manager

Managed civil design and survey projects for a small engineering firm focused on land development. Played a vital role in all stages through planning and completion of diverse ventures including a county government complex, 20-acre subdivision, and numerous city lot developments and re-developments.

United States Air Force, Dover, Delaware **1/03 to 1/05**
Engineering Journeyman

Enlisted as an Engineering Assistant for the 436th Civil Engineering Squadron located on Dover AFB, DE. Served the Air Force by conducting training on manual, automated, and GPS survey equipment for peers, designing and installing a system of control points for base survey operations, and completing numerous drafting responsibilities including as-built drawings of infrastructure projects and base mapping of utilities.

Education:

Texas A&M University, College Station, Texas
B.S. Civil Engineering-Engineering Measurement
M.S. Civil Engineering-Transportation Engineering

Accreditations:
E.I.T., Texas

Keith A. Daly
Project Controls Manager
2007-present

As the Project Controls Manager of the Columbia River Crossing Project, Keith is responsible for the management, oversight and coordination of estimating and cost control measures, documentation and reporting systems management and provides guidance to ensure compliance with WSDOT and ODOT policies and procedures, state and federal laws and regulations, and agreement terms and conditions, on the CRC project.

Professional Experience:

WSDOT, Vancouver, WA **01/2001 to 10/2007**
Office Engineer - Transportation Engineer III

Supervised 5-6 employees in a Construction/Design office administering a $45 million I-5 widening project. Supervised and prepared construction contract change orders, cost estimates and negotiated costs with contractors. Design contract modifications, including alignment, grades and quantities. Estimate engineering expenses so contracts can be aged accurately.

WSDOT, Hazel Dell, WA **02/1999 to 01/2001**
Office Engineer - Transportation Engineer III

Supervised 5-6 employees in a Construction office administering a $30 million I-5 widening project. Supervised and prepared construction contract change orders, cost estimates and negotiated costs with contractors. Design contract modifications, including alignment, grades and quantities. Estimate engineering expenses so contracts can be aged accurately.

WSDOT, Longview, WA **06/1998 to 02/1999**
Office Engineer – Transportation Engineer III

Supervised 4-5 employees in a Construction office administering various projects including pavers, bridge painters, rock fall projects, and small improvement projects.

WSDOT, Longview, WA **02/1996 to 06/1998**
Construction Project Inspector/Designer – Transportation Engineer II

Responsible for the construction contract inspection on major WSDOT construction projects including grading, drainage, excavation, embankment, compaction and bridge replacement.

WSDOT, Longview, WA **05/1995 to 02/1996**
Chief Inspector – Temporary Transportation Engineer III

Responsible for supervising a staff to perform construction contract inspection on major WSDOT construction projects including grading, drainage, excavation, embankment, compaction and bridge replacement.

Education:

Centralia Community College, Centralia, WA
Associates Degree Civil Engineering Technology, June 1987

Mark A. Degenhart
Constructability Engineer
2008-present

As the Columbia River Crossing Constructability Engineer, Mark ensures that all roadway, structures and transit conceptual plans are constructible without fatal flaws. Provide quality control and quality assurance on the utilities and staging elements of the project. Additional duties include Safety Engineer

Professional Experience:

WSDOT, Vancouver, Washington **6/2003 to 9/2008**
Transportation Engineer III

Serve as Design/Construction Team Leader in charge of multiple major projects within the Clark County area of the Southwest region of WSDOT. Represent the Department at public meetings, open houses, to local agencies, contractors, consultants, for specific projects. Management of teams of professionals, both agency and consultant, with the intent on delivery of the projects assigned. Review and administer contract plans and special provisions, prepare and monitor project schedules, monitor project funding, maintain project files, maintain material requirements/documentation, coordinate with support groups and local agencies, prepare finale records, generate as-builts, prepare serial letters to the contractor, prepare and negotiate change orders. Provide leadership and guidance for entry level engineers and technicians.

WSDOT, Vancouver, Washington **11/2000 to 6/2003**
Transportation Engineer II

Serve as lead inspector on multiple projects within the office. Inspect and direct the inspection of roadways, major structures, drainage and sanitary sewer systems, illumination systems, electrical systems, signal systems, and stake out alignments. Review special provisions, specifications, plans and estimates. Train entry level engineers and technicians.

WSDOT, Vancouver, Washington **4/1990 to 11/2000**
Transportation Technician II / III

Serve as inspector/material’s tester on several projects with in the office. Document construction activities and materials. Perform various inspection/testing duties including structures, paving operations, embankments, drainage systems, sidewalk and curb, signal, illumination, electrical systems, striping, erosion control and traffic control. Prepare field note records for pay estimates. Quantity calculations and checking Design / Construction. Performed various survey duties Design / Construction. Utilized engineering software CAICE, CEAL, Microstation, AutoCAD, Arcview, CAPS, Microsoft Excel, Microsoft Word, Microsoft Outlook, Filemaker Pro.

Education:

Clackamas Community College, Clackamas, Oregon
Associate of Applied Science, 1989

Matthew Deml, P.E., S.E.
Bridge Engineer
2006 – Present

Matt is responsible for coordination of the consultant bridge engineers and communication with the DOT bridge engineers. Responsibilities included coordination of all structures crossing the Columbia River and North Portland Harbor and coordination over 50 smaller structures along the project corridor. He authored bridge type selection reports, seismic study reports, aviation and navigation technical reports, and other environmental impact reports related to the Columbia River Crossing Project's bridges

Professional Experience:

Matt has been involved in numerous highway and transit bridge projects in several different regions of the country. He is experienced all stages of project development and multiple methods of project delivery including design-build and construction manger/general contractor (CM/GC).

Utah Department of Transportation Owner, Salt Lake City, Utah **2005-2006**
I-15 New Ogden-Weber (NOW)

As a senior engineer, Matt completed the preliminary design documents and assembled other required documentation for all 14 bridge structures in the project. This information was incorporated into the request for proposals submitted to each of the design/build teams.

Utah Transit Authority, Ogden, Utah **2004-2005**
Frontrunner - Commuter Rail

As a bridge engineer Matt completed the design of two major bridge structures. The first structure was an 11-span 1,333-foot-long (406-meter-long) structure. The second was a four-span 659-foot-long (201-meter-long) structure.

New Mexico Department of Transportation, Albuquerque, New Mexico **2004-2005**
Coors Boulevard—I-40 Interchange Reconstruction

As a bridge engineer, Matt completed the design of two bridges for this design/build project. Seismic analysis and design was also completed on two additional bridges.

North San Diego County Transit Development Board, California **2004**
Sorrento – Miramar Realignment

As a bridge engineer, Matt, performed design of an eight-span, 763-foot-long (233-meter-long) rail bridge. The bridge consisted of a prestressed box girder superstructure and single column piers varying in height from 18 feet (5.5 meters) to 52 feet (16 meters).

Utah Transit Authority, Murray, Utah **2002-2003**
UTA Light Rail (Trax) Bridge over I-215

Matt participated in the design and construction of a 228-foot (88-meter), two-span rail bridge. The bridge received a Silver award from *Intermountain Contractor* magazine in their best of 2003 edition.

Education:

University of Utah, Salt Lake City, Utah
M.S. Civil Engineering, 2005
B.S. Civil Engineering, 2000

Accreditations:
Professional Engineer in Washington and Oregon
Professional Structural Engineer in Utah

Jenna Dinsmore, E.I.T.
Consultant Track Designer
2009-present

Ms. Dinsmore is working on designing the LRT alignment. Her key tasks include working with the bridge designers to solve unique design problems on the multi-modal bridge and with the civil transit designers to fit the LRT and stations into the existing downtown Vancouver street network. She is involved with all aspects of the track design including special trackwork, station design, track structure and typical sections, at-grade crossings and identifying track features such as rail lubricators and drainage.

Professional Experience:

David Evans and Associates, Portland, OR **07/2007 to Present**
Designer, E.I.T.

Ms. Dinsmore is has been a track and roadway designer at DEA with experience working on a wide variety of transportation projects. Her experience includes work on several light rail projects for the Tri-County Metropolitan Transportation District of Oregon as well as the Utah Transit Authority. She has experience with roadway design, including evaluating roadside safety components. Ms. Dinsmore's experience includes designing horizontal and vertical alignments, creating typical sections, detailing special trackwork and performing electronic modeling to produce cross sections and design surfaces as well as performing, presenting and documenting technical calculations on various aspects of her work

Education:

Oregon State University, Corvallis, Oregon
B.S. Civil Engineering

Accreditations:
Engineer-In-Training

Jebediah A. Doran
Design Manager
2006 – Present

Jeb supports TriMet's capital project department by managing design and permitting of the WES Commuter Rail Project. His tasks include management of consultant team and to insure design meets project timelines, safety standards, ADA guidelines, jurisdictional requirements, TriMet design standards, and budget constraints, while addressing both public and project's partner needs. He insured the timely delivery of all federal and local permits and maintains a high level of compliance with permit conditions and requirements that will contribute to the successful close out of the project. In addition, Jeb oversees the WES Commuter Rail's wetland mitigation contract including permitting, construction, monitoring and maintenance of the mitigation sites.

Professional Experience:

Over the last 11 years, Jeb has acquired a diverse array of complimentary skills including landscape design, maintenance, and construction; wetland, stream and forest restoration; community outreach; land use planning and permitting; and transit design, permitting and construction.

Lane County Dept. of Public Works, Eugene, Oregon **2004-2006**
Land Management Division

Land Management Technician responsible for collaboration with plans examiners, inspectors, designers, developers, contractors, property owners, real estate agents, and legal consultants to enforce compliance with all applicable land use, building, and nuisance codes for existing and current development within Lane County.

Suislaw Watershed Council, Mapleton, Oregon **2003**
Indian Creek Watershed Restoration Plan

Restoration Coordinator responsible for development of watershed restoration plan and community outreach document that compiled historical research and archeology, public input, landscape analysis, and technical data to guide design and construction of future stream, wetland, and forest restoration projects within the watershed.

U.S. Forest Service, Rocky Mountain Research Institute, Moscow, Idaho **2002**
National Fire Plan Research and Development

Field Technician responsible for site analysis and data collection for documentation of existing conditions and vegetative succession at field research plots. Efforts contributed to completion of the 2003 National Fire Plan.

Green Hans Landscape and Construction, Eugene, Oregon **1998-1999**
Landscape Construction and Maintenance

Landscape lead responsible for construction and maintenance of commercial and residential projects.

Medallion Landscape Inc, Eugene, Oregon **1997-1998**
Landscape Construction and Maintenance

Landscape crewman responsible for construction and maintenance of commercial and residential projects.

Country Landscape Inc, Ames, IA **1997**
Landscape Construction and Maintenance

Landscape crewman responsible for construction and maintenance of commercial and residential projects.

Education:

Allied Arts and Architecture, University of Oregon, Eugene, Oregon
B.L.A. Landscape Architecture, 2004

Coral Egnew
Community Affairs Representative
2001-present

Develop and facilitate public involvement plan to engage public discussion of light rail design. Coordinate elements of design with engineers to develop and communicate project information as they affect neighboring residents and businesses. Coordinate with engineers and planners to develop and communicate project information to affected parties. Establish partnerships and relationships of mutual respect with neighborhood associations, community and business organizations and individual residents and businesses directly affected by a light rail project.

Professional Experience:

WSDOT, Vancouver, Washington **2008 to present**
I-5 Columbia River Crossing Partnership

Synthesize and balance interests of local jurisdictions, neighbors, and businesses in providing advise on project design details. Develop working knowledge of design and translate community issues to appropriate technical specifications for feedback into the design. Coordinate and assist with door-to-door distribution. Assist in formulating TriMet positions on fast-changing issues. Upon direction, communicate these issues to community members.

TriMet, Portland, Oregon **2004 to 2009**
I-205/ Portland Mall MAX Light Rail Project

Develop and implement public relations and communication for the downtown segment of the I-205/ Portland Mall MAX Light Rail Project. Coordinate with city auditor's office to develop and implement local improvement district to acquire additional project funding. Synthesize and balance interests of local jurisdictions, neighbors, and businesses in providing advise on project design details, conduct of construction and construction impact mitigation plans. Continually develop and implement strategies to assure the continued viability of local businesses affected by construction. Conduct tours and make presentations about the project to neighborhood/ community groups. Develop and facilitate public involvement plan to engage public discussion of bus service connections to light rail/streetcar/commuter rail alignments.

TriMet, Portland, Oregon **2001 to 2004**
Interstate MAX Light Rail Project

Knowledge of design and construction documents and translate community issues into appropriate technical specifications for feedback into the design and construction process. Coordinate interactions between construction personnel and residents/businesses regarding access, utilities and construction schedules. Support negotiations for acquisition of construction easements, driveway relocations and other special property agreements. Act as first point of contact for all complaints. Proactively identify and resolve urgent problems affecting project neighbors on an on-call, 24-hour basis and ensure that contractor, TriMet and jurisdictional staff respond in a timely manner. Assist in the development of and dissemination of a project safety program for the public, including presentations to businesses, schools, residents, and social organizations locate along the light rail alignment regarding safe behaviors.

Seth English-Young
Planner II
2010-present

Produce Environmental Impact Statement (EIS) for Columbia River Crossing Project. Analyze impacts to the built and natural environment and recommend associated mitigation. Contributing author of EIS Description of Alternatives, Land Use Technical Report, and Land Use and Economics EIS section.

Professional Experience:

Planning Resources, Inc, Lake Oswego, OR **3/07 to 2/09**
Land Use Planner/Project Manager

Directly responsible for the management of over 40 concurrent land use projects. Recommended use and site plan alternatives to best utilize properties and maximize developable area while minimizing environmental impact. Facilitated and presented at meetings with neighborhood associations.

Rudin Center for Transportation Policy and Management, New York, NY **3/05 to 5/06**
Graduate Research Assistant

Researched academic projects, including: high-speed rail in the United States, inter-jurisdictional coordination in metropolitan areas; city-state ownership issues regarding roadways within city boundaries.

Hunts Point Economic Development Corporation, Bronx, NY **11/04 to 8/05**
Commercial Revitalization and Planning Consultant

Coordinated the efforts of property owners, business owners and NYC Department of Small Business Services in planning for the establishment of the Southern Boulevard Business Improvement District. Recruited business owners, prepared grant proposals requesting City matching funds, and managed consultants for the Storefront Improvement Program.

Puget Sound Regional Council, Seattle, WA **3/02 to 7/04**
Assistant Planner

Assisted in creating procedures for tracking historical financial data of transportation projects. Codified relationship between Transportation Improvement Program projects and long-range transportation plan.

Education:

New York University, Robert F. Wagner School of Public Service, New York, NY
Master of Urban Planning, May 2006

University of Puget Sound, Tacoma, WA
Bachelor of Arts: Economics, Business and Public Administration, May 1999

Accreditations:
American Institute of Certified Planners, 2008-present

D. Clay Erickson
Consultant CADD Technician
2005 – Present

Clay has worked to provide all manner of plans and exhibits for the Columbia River Crossing Project.

Professional Experience:

Clay is a draftsman who has combined his knowledge of computer aided drafting and design tools with a grounding in traditional civil drafting techniques to provide comprehensive support to civil engineers, surveyors, planners and architects.

Harris-McMonagle, Inc., Tigard, Oregon **2001-2005**
Use of Autocad/Land Desktop in the design and drafting of roadways, grading, utilities, water retention systems, as-builts, surveys and plats related to site development.

Sandis Humber Jone, Inc., Salinas, California **1999-2001**
Use of Autocad/Land Desktop to create plans, surveys, plats and graphics for site development.

Bledsoe, Tapp & Riggert, Inc., Bloomington, Indiana **1998-1999**
Use of Microstation/Eaglepoint for subdivision design and survey drawings.

Full time degree work **1992-1998**

JHK & Assoc. (now TransCore), Tucson, Arizona **1987-1992**
Manual and computer drafting of plans and exhibits for freeways, sports parks, signing/striping and related engineering graphics.

Franzoy-Corey Architects & Engineers, Phoenix, Arizona **1984-1986**
Manual drafting of plans and exhibits for roadway, canal and airport projects.

Weir & Assoc., Arlington, Texas **1983-1984**
Manual drafting of subdivisions, surveys and exhibit graphics.

Freese & Nichols, Fort Worth/Austin,TX **1980-1983**
Manual drafting of water treatment plant design.

Education:

Tarrant County Junior College, Ft. Worth, Texas
AAS Drafting and Design, 1985

Clayton State College, Morrow, Georgia
BM Music, 1996

Indiana University, Bloomington, Indiana
MM Music, 2001

Joseph D. Eskew
Senior Task Order Manager
Feb 2010-present

Task Lead for transit related civil engineering providing design and direction to civil engineering team for local jurisdictional roadways affected by transit development; parking structure and transit station site development and design in coordination with transit architect.

Professional Experience:

David Evan and Associates, Inc., Portland Oregon **11/2005 to 5/2010**
Senior Project Engineer/Task Lead/Project Manager

Design Manager of the Rockwood Transit Station Redevelopment team which converted a 30 year old transit station to a new urban design.

Design Manager of civil engineering for the Ruby Junction expansion as part of the TriMet Portland to Milwaukie LRT Project Preliminary Engineering effort as a subconsultant to LTK Engineering Services providing facilities design of roads and parking lots.

Task Lead of Civil Engineering team for the South Corridor LRT, I-205 Segment leading the design effort for four surface park and ride lots, seven transit stations and local road improvements. Also provided engineering support for design/build efforts during project construction.

Lee Engineering, Inc., Oregon City, Oregon **6/1985 to 11/2005**
Senior Project Manager

Project management and design of civil works including storm sewer hydraulic studies, storm water treatment design, storm sewer pipeline design, sanitary sewer pipeline design and rehabilitation, potable water pipeline design, potable water system master plan studies, reservoir design, water treatment plant design, urban and rural roadway design, subdivisions, and parking lots.

Education:

Oregon State University, Corvallis, Oregon
BS Civil Engineering 1985

Accreditations:
Oregon PE Civil and Environmental Engineering

Doug Ficco, PE
Project Director
2004-present

As Director of the Bi-state Columbia River Crossing Project Doug is responsible for project development and implementation. The project includes replacement of the Interstate-5 bridges, extension of Light Rail Transit across Hayden Island and through downtown Vancouver and rebuilding approximately 5 miles of Interstate-5 along with 7 major urban interchanges. Doug's responsibilities for this multi-billion dollar project include: program management oversight from scoping through completion of construction; defining policy direction for the staff and team of consultants; developing partnerships with federal and state agencies and local jurisdictions; developing Bi-state partnerships; and defining project development and implementation strategies.

Professional Experience:

WSDOT, Southwest Washington Region **1997 to 2004**
Regional Construction Engineer

As the Regional Construction Engineer, Doug directed the transportation capital construction program for WSDOT's Southwest Region. He managed the project offices, regional materials laboratory, regional training program, and regional construction administration staff. He was responsible for the administration of projects from planning through construction; ensuring compliance with local, state, and federal laws and regulations; and resolving claims and disputes between WSDOT and contractors.

WSDOT, Southwest Washington Region **1994 to 1997**
Regional Program Manager

Responsibilities included monitoring and controlling the fiscal and workforce expenditures and determining the projects and scope of projects to be included in the Region's Capital Construction Program. Analyzed and recommended effective solutions to the Regional Administrator on significant budget, scheduling and workforce issues. Coordinated with local, state, and federal offices on project scheduling, definition and funding of regional transportation projects. Responsible for managing the Region's IT and Accounting Sections.

WSDOT, Southwest Washington Region **1989 to 1994**
Project Engineer

As Project Engineer, Doug managed the Engineering Field Office, including administration of design and construction of major transportation projects. He supervised engineers, inspectors, surveyors, and office staff that worked on the design, development, and administration of the projects, and coordinated with public utilities, public agencies, and contractors.

WSDOT, Southwest Washington Region **1986 to 1989**
Assistant Project Engineer

As the Assistant Project Engineer, Doug assisted in the management of the Engineering Field Office as described above.

WSDOT, Southwest Washington Region **1979 to 1986**
Construction/Design Team Leader/Chief Inspector

Managed a team of professionals, both agency and consultant, to deliver assigned projects. His responsibilities included preparation of the design reports, right-of-way plans, cost estimates, hydraulic reports, contract plans, and other reports related to highway design and construction.

Education:

Portland State University, Portland, OR
Bachelor of Science in Structural Engineering, 1978

Accreditations:
Professional Civil Engineer – State of Washington #21444

Carley Francis
Outreach and Planning Assistant (Transportation Planning Specialist III)
2007-Present

Carley supports the Communications Manager to conduct project outreach, manage production of print and online materials, develop outreach events and provide timely and accurate information to the media, the public, project partners and other project staff.

Professional Experience:

WSDOT, Vancouver, WA **2006 to 2007**
Transportation Planning Specialist II

Developed traffic projections and micro-simulations and conducted data analysis to support planning tasks, including the Interchange Justification Report for the SR 14 – Camas-Washougal Widening & Interchange. Acted as the Southwest Region bicycle and pedestrian liaison, reviewed development applications and produced supporting documents using GIS software.

City of Baltimore, Baltimore, MD **2005 to 2006**
Planner I

Environmental planner responsible for completing the first Bicycle Master Plan for the city (adopted 5/06) and acting as city bicycle liaison, reviewing the capital budget of the transportation department, finalizing the city's Transportation Improvement Program submission to the regional government, reviewing forest conservation permits and assistance permit seekers in meeting city and state laws, coordinating review of proposed amendments to the maritime master plan, securing funding for trail projects (secured $450,000), participating in development of the city comprehensive plan update (adopted 6/06), using GIS to support functions of department environmental planners.

City of Baltimore, Baltimore, MD **2004 to 2005**
Planning Assistant

Provided support for the land use section and the planning department as a whole by leading staff from four agencies to develop an interagency prototype database for tracking development projects, acting as liaison to the Mayor's Bicycle Advisory Committee and assisting planning staff on the Bicycle Master Plan, using GIS to digitize shapes for a city-wide directory and to prepare maps, tracking city council bills assigned to Planning Commission and ensuring public access to Planning Commission hearings, project information and general department and permit policies and procedures.

Alliance for Education, Seattle, WA **2002 to 2004**
Program Coordinator – Franklin High School Public Service Academy

Created and managed partnerships and programs for career based learning opportunities for innovative small school (150 students, 7 teachers), including securing federal grants, recruiting and supervising over 75 volunteers.

Education:

Portland State University, Portland, OR
Pursuing M.A. Urban and Regional Planning

University of Washington, Seattle, WA
B.A., Community and Environmental Planning, 2002
B.A., Comparative History of Ideas, 2002

Natalie A. Freeman, E.I.T
Civil Engineer I
2007 – Present

Natalie is on the Highway Design Team, responding to design requests on the Oregon side of the CRC project. She maintains designs for the local street network in Portland in conjunction with the Marine Drive Interchange designs and is also working closely with the Pedestrian and Bicycle Advisory Committee on Multi-Use path facilities in Oregon.

Professional Experience:

Natalie Freeman is a civil engineer-in-training with Parsons Brinckerhoff (PB), experienced in highway engineering, local street design and bicycle & pedestrian facility design. Natalie's duties on highway projects have included design and modeling of mainline and interchange alternatives design under the direct supervision of a lead civil engineer. Her responsibilities have included geometric design; modeling and surface creation in InRoads; plans preparation; limited drainage design; drafting Design Exceptions and making committee presentations. Natalie is proficient in the use of Microstation & InRoads and is familiar with design standards for CalTrans, Oregon DOT, Washington DOT as well as ADA, Multi-use path & bicycle facilities.

Parsons Brinckerhoff, CRC, Vancouver, Washington **June 2007-Present**
Highway Design Team, I-5 Columbia River Crossing Project

Engineer-in-training working on various civil engineering duties associated with preferred alternative selection and design in support of FEIS. Assignments on this project have included alternatives design of Hayden Island and Marine Drive Interchanges, local street design for both City of Vancouver and City of Portland, bicycle & pedestrian facility design, intersection and roundabout design. Natalie's role requires coordination with Traffic, Transit and Bridge engineers as well as daily implementation of CAD design tools Microstation XM & InRoads 8.7.

Parsons Brinckerhoff, Portland, Oregon **March 2007 - May 2007**
Oregon Bridge Delivery Partners Bridge Bundle 313, Rogue River, Oregon

Assistant civil engineer working on re-design of Rest Area off-ramp to better accommodate frequent truck traffic & avoid further damage to I-5 overcrossing Bent Cap. Natalie took project to Draft Design Acceptance Package (DAP) level including roadway, retaining wall, drainage, & barrier design. Bridge Bundle 313 is part of a package of Bridge Repair and Improvement projects for Oregon DOT.

Parsons Brinckerhoff, San Diego, California **June 2006 - Feb 2007**
SR 54 Gap and SR 125 Connector, Chula Vista, California

Assistant civil engineer charged with redesign of five drainage systems to include bypass filtration device during construction phase of design/build project. Duties included custom design of cleanout diversion weir and integration with client's choice of filtration device. RFR required daily contact and coordination with contractor. The project included preliminary engineering and final design of nearly 2 miles of connecting highway, 13 structures including a tunnel, and the upgrade of 2 miles of four-lane, divided highway to a six-lane freeway.

Education:

University of California at San Diego, San Diego, California
B.S. Engineering Sciences, Structural Engineering 2006
B.A. Visual Arts, Photography 2006

Accreditations:
Engineer in Training in Washington 2007 (28521)

Tonja L. Gleason C.P.A.
Senior Project Controls Manager, Columbia River Crossing Project
2005-present

Professional Experience:

Parsons Brinckerhoff, Portland, OR **2005 to present**
Project Controls Manager

Manager in charge of development, implementation and ongoing administration of the Project Control systems needed in order to manage the Columbia River Crossing Project.

Major systems and responsibilities include: Cost Control, Document Control and Schedule Control.

Panama Canal Authority, Panama City, Panama **2003 to 2005**
Senior Consultant

Senior Consultant in charge of assessing the capabilities and performance of existing program controls within the Panama Canal Authority that would be used to manage the Third Lane Locks multi-billion dollar expansion program. From these initial assessments recommendations were made as to configuration and set up of all systems needed to embark on the mega project.

DFW International $2.8B Capital Development Program, Texas **1999 to 2005**
Senior Project Controls Manager

Senior Project Controls Manager responsible for the creation of the project controls systems and infrastructure that enabled a complex and fast-track program with multiple management teams to be constantly and consistently analyzed and reported on with timely, complete and accurate information. Development and deployment of a reporting system geared specifically to the needs of the Airport's $2.8B capital development program which was able to provide accurate, timely and relevant information to individuals at all levels of the organization, as well as interested outside stakeholders. Reported directly to the Senior Vice President and the Program Executive.

DFW Int'l Airport East Side Runway Mitigation Program, Texas **1996 to 1999**
Senior Project Controls Manager

Dallas Fort Worth (DFW) International East Side Runway Mitigation Program, Dallas, Texas: Financial Controller charged with the responsibility of going in midway through the program and reconstructing the documentation of the financial reporting for the $176M program that was in danger of losing grant funding due to non-compliance. Audited by the United States Department of Transportation twice prior to the end of the program with no significant audit findings.

Deloitte & Touche, Dallas Fort Worth, Texas **1990 to 1996**
Auditor

Auditor with a primary governmental client base and an emphasis on the Single Audit Act. Major clients included City, State School District and Water Authority agencies.

Education:

University of Texas at Arlington, Arlington Texas
BBA Accounting 1991, Highest Honors

Franklin T. Green, PE
Structures Engineering Manager
2007-present

Responsible for ensuring that all aspects of the conceptual design for the Columbia River Crossing (CRC) Project meet the design standards and policies for WSDOT, ODOT, FHWA, and FTA. It is also my duty to coordinate and present design concepts and cost estimates to project stakeholders and public as well as drafting responses to public information requests about the CRC. Responsible for managing the Consultant Design team's development of conceptual designs and costs estimates and coordination with the project stakeholders including ODOT, WSDOT, FHWA, FTA, City of Portland, City of Vancouver, Metro, RTC, Port of Portland, Port of Vancouver, Trimet, and C-TRAN. Review and approve design deliverables to ensure that the design concepts are constructible and fundable. Responsible for coordinating and conducting the Value Engineering and Cost Estimate Validation Process workshops for the CRC.

Professional Experience:

WSDOT, Vancouver, WA **2006 to 2007**
Assistant Design Engineering Manager, Columbia River Crossing Project

Assisted the Design Engineering Manager with direction, oversight, and outcome of highway design functions. Acted as a technical liaison between CRC Staff and Bi-State Agencies to ensure that all agency guidelines and standards were met. Worked directly with consultant design task leaders to ensure that deliverables are received as well as reviewing and approving all deliverables related to highway design. Responsible for coordinating, obtaining, and maintaining the technical and procedural manuals for all stakeholders of the CRC project for the staff's use. Responsible for ensuring the organization, storage, and operation of all engineering related files.

WSDOT, Vancouver, WA **2004 to 2006**
Design/Construction Team Leader, Vancouver Area Engineering Office

Design Team Leader - Responsible to ensure that all aspects of the design meet agency standards for the SR500 / Sj. Johns Interchange and Salmon Creek to NE 129th Street Noise Wall projects. Coordinated between the design team and support groups such as Bridge and Structures, Geotech, Utilities, Real Estate Services, Local Programs, and Traffic. Responsible for all technical aspects of the project as well as ensuring that all milestones for the project schedule were met.

Construction Team Leader - Coordinated and mentored the project inspectors so that all aspects of the project would be constructed per the contract plans and specifications for the I-5 widening project from Salmon Creek to I-205. Coordinated with the contractor and local agencies, presented the project at public meetings, prepared change orders and back up for change orders, writing correspondence to the contractor, preparing as-builts, working with inspectors and office staff to complete clear and concise pay notes, and reviewing the contract plans and special provisions.

WSDOT, Vancouver, WA **2002 to 2004**
Transportation Engineer 2

Served as a construction inspector on the widening project in Battleground and as Project Lead Inspector on the I-5 widening project from Salmon Creek to I-205. Inspection duties included roadway excavation operations, determining if the subgrade was acceptable / suitable, crushed surfacing base rock placement, curb installation, and solving construction related issues with the contractor and WSDOT personnel. Performed the preliminary geometric design for the SR 500 / St. Johns Interchange Project.

Education:

Montana State University, Bozeman, Montana
B.S., Civil Engineering (12/2001)

Holly Greenidge
Document Controls Assistant
2006-present

As a member of the Project Controls Team, Holly's responsibilities include tracking project deliverables using ProLog, producing various status reports, coordination and follow-up for monthly deliverables meetings, preparation of training documents, and rebuilding project files indexes on a weekly basis. She also does electronic filing of documents received in the Document Control In-box and does formatting, proofreading, and transmitting of CRC reports.

Professional Experience:

Holly has been with David Evans and Associates, prime consultant, since 2006. She is skilled in project administration, office management, training, problem-solving and developing efficient office systems.

TriMet, Owner, Portland, Oregon **2006**
Administrative Assistant

Assisted the Project Assistant for the I-205 Light Rail design build project. Tasks included assisting with invoice preparation, formatting specifications, and filing.

David Evans and Associates, Portland, Oregon **2006**
Receptionist (concurrent with above position)

Operated computer switchboard and coordinated meeting & pool vehicle schedules.

Action Employment, Portland, Oregon **2005**
Receptionist/Administrative Assistant

Filed, entered data into Excel, typed letters, mailed packages, and answered phones. Streamlined system for mass mailings.

Servant Year Internship Program, Chicago, Illinois **2002 to 2005**
Operations Director

Administered petty cash, reimbursements, weekly donations, and bank deposits. Utilized Servant Keeper database to enter data and generate various reports. Redesigned purchase receipts in order to streamline QuickBooks data entry. Created a fiscal budget in Excel based on QuickBooks numbering system. Manipulated transaction detail reports and evaluated adherence to budget. Responsible for purchasing and meeting documentation. Provided supervision and guidance for interns and volunteers

Alternative Schools Network, City, State **2002**
Receptionist/Administrative Assistant

Fielded incoming calls, shipments, and emails. Balanced and prioritized administrative tasks received from multiple departments.

Education:

North Park University, Chicago, Illinois
Bachelor of Arts, 2002

John R. Griffiths, PE
Manager, Rail Operations Planning
Capital Projects & Facilities Division / Operations Division
1996 – Present

John managed the development and updating of operating and fleet management plans for TriMet's light rail and commuter rail systems. He assured that operating plans were consistently applied in rail project planning, design and construction programs by serving as liaison between planning, engineering and operations.

John managed planning consultants and operations department input in the development of TriMet's "Rail Operation Facilities Master Plan". He lead consulting teams, the land use application and public hearing process and bid document preparation for the Interstate and Mall/I-205 operations and maintenance facility expansions. The expanded facilities include accommodations for 127 LRVs and an Operations Control Center (OCC) where rail central control and bus dispatch are co-located.

John managed consultants who developed train/signal and train/traffic simulation models using AutoMod and Vissim, respectively.

Professional Experience:

TriMet, Portland, OR **12/91-12/95**
Engineer IV & V, Westside Light Rail Project

Project Engineer managing final design and bidding for Line Sections 4C (Downtown Portland), 8 (S.W.170th to 185th) and Sunset Transit Center contracts. Directed the development of TriMet's first train/traffic computer simulation models using Transsim and Vissim.

TriMet, Portland, OR **9/87-11/91**
Engineer III, Engineering Services Department

Responsible for station design, site evaluation for east tunnel portal and Downtown Portland alignment design for Westside LRT Preliminary Engineering. Developed the initial station layouts and directed consultants who refined those layouts and studied the existing MAX system in order to update station design criteria. Directed value engineering consultant who studied Westside Corridor Project.

Education:

University of Virginia, Charlottesville, VA
M.S.C.E. in Transportation Planning., 1979

Worcester Polytechnic Institute, Worcester, MA.
B.S.C.E. in Transportation Engineering., 1976

Accreditations:
Professional Civil Engineer, Oregon #12933

Cameron M. Grile, P.E.
Consultant Transportation Engineer
2005 – Present

Mr. Grile is a transportation engineer working on traffic simulation models for freeway and local street operations. He has also completed traffic studies and analyzed interchange configuration options in coordination with design engineering staff. He has worked to assist in the regional modeling and traffic forecasting effort. Mr. Grile has been involved in the review and production of projected traffic volumes and supported DOT staff with presentations, maps, figures and other graphics in relation to traffic operations. He has participated in several community outreach events to discuss the project with the public.

Professional Experience:

David Evans and Associates, Inc., Portland, OR **11/1989 to present**

Mr. Grile has worked on a variety of projects in both Oregon and Washington in his four and a half years as a consultant. Projects included corridor studies, interchange area management plans, work zone traffic control plans, environmental impact statements, and municipal development projects. He has been with David Evans and Associates, Inc., prime consultant for the CRC project, since 2004.

Selected Transportation Project Experience

- *Hayden Island Traffic Analysis, City of Portland, Oregon.* Performed capacity analysis of I-5 in the vicinity of Hayden Island, conducted intersection and ramp terminal queuing analysis, and summarized the I-5 crash history in the vicinity of Hayden Island.
- *Rose Biggi Avenue Extension, ODOT, Hillsboro, Oregon.* Responsibilities included developing existing and future traffic volumes, calibration and application of Synchro/SimTraffic model, evaluate impacts of proposed project. This project included looking at impacts to local intersections due to nearby LRT transit service.
- *Willamette River (Van Buren St.) Bridge Environmental Baseline and Bridge/Roadway Alternatives Concepts Report, ODOT, Corvallis, Oregon.* Responsibilities included developing a Synchro/SimTraffic model for testing operational differences between different design alternatives and presenting results to the technical advisory committee.
- *South Medford Interchange 27, ODOT, Medford, Oregon.* Responsibilities included development of base year and future year traffic volumes, reviewing inputs to the regional forecasting model, and the creation and application of a Synchro/SimTraffic model to evaluate the operational characteristics.
- *Interchanges 103, 106, & 108 Area Master Plan, ODOT, Douglas County, Oregon.* Responsible for evaluating the impacts of proposed capacity improvements, conducting a safety analysis, development of base year and future year traffic volumes, creation and application of a Synchro model, performing a freeway operations analysis, and assisting in the development of an access management plan.
- *Sunrise Corridor Alternative A, ODOT, Clackamas, Oregon.* Responsibilities included a safety analysis of crash data and SPIS locations within the project study area. He also assisted in the calibration of the Synchro/SimTraffic traffic operations model.

Education:

Oregon State University, Corvallis, Oregon
M.S. Civil Engineering, 2004
B.S. Civil Engineering, 2002

Accreditations:
Professional Engineer in Washington and Oregon

Heather Gundersen
Environmental Manager
6/2005 to Present

I have oversight and management of the environmental task line for both WSDOT and ODOT on the Columbia River Crossing project (CRC). The CRC project is a multi-modal, complex project, characterized by its highly controversial and sensitive nature, numerous project sponsors (both transit and highway), and importance to the region.

Some of my major responsibilities include, building relationships with regulatory agencies that encourage early participation in project planning that results in environmental streamlining and smoother project permitting and ensuring WSDOT and ODOT compliance with the National Environmental Policy Act, Section 4(f) of the US Department of Transportation Act, Section 6002 of SAFETEA-LU, Clean Water Act, Endangered Species Act, and other relevant federal and state environmental laws

Professional Experience:

Oregon Department of Transportation, Portland, OR **11/2004 to 6/2005**
Permits/Water Quality Specialist

Coordinated successful environmental permitting of transportation projects for Region 1 of the Oregon Department of Transportation.

URS Corporation, Portland, OR and Anchorage, AK **9/2003 to 11/2004**
Environmental Scientist/Planner

Worked on several small and large transportation projects in both Portland and Anchorage Alaska. In Anchorage, I was responsible for managing portions of large transportation and development projects for various government agencies, Including Federal Highway Administration and Bureau of Indian Affairs.

United States Geological Survey, Portland, OR **5/2001 to 9/2003**
Physical Scientist

Key member on the Oregon Division National Water Quality Assessment Program for the Willamette Basin. Led the Urban Land Use Gradient study site selection process, where water quality and habitat conditions within streams were evaluated and correlated with percent urban land use in the watershed.

Washington Department of Transportation, Olympia, WA **8/2000 to 7/2001**
Environmental Planning Associate

Placed at WSDOT in the Environmental Services Office through the Environmental Careers Organization. Assisted various staff with developing agency wide NEPA and mitigation policy.

Education:

Portland State University, Portland Oregon
Masters of Urban and Regional Planning – Environmental Specialization, 2003

Portland State University, Portland Oregon
Bachelor or Science – Environmental Science, 1999

William Hall
NEPA Natural Environment Lead/ Lead Biological Assessment Author
2005-present

Bill is the natural environment technical leader for the Columbia River Crossing EIS. He coordinates many tasks including preparation of methods and data reports and technical reports covering wildlife, fisheries, plants, wetlands, geophysical/soils, and hazardous materials. Bill is working closely with agency representatives to determine appropriate methods of impacts analysis and implementation of impact minimization methods. He is assisting with natural resources permitting and strategy.

Professional Experience:

Metro Regional Government, Portland, Oregon **08/2007 to present**
Portland-Milwaukie Light Rail - NEPA Ecosystems Lead/Permitting Strategist

Bill is the lead author for the Ecosystems discipline of this NEPA process, integrating wetlands, waterways, fisheries, wildlife, and plants sub-disciplines into the results report and SDEIS. He is assessing potential impacts from project elements on threatened and endangered species and their habitats. Bill is also assisting Metro and Tri-Met with natural resource regulatory strategy.

ODOT, Portland, Oregon **5/2004 to 6/2008**
Newberg-Dundee Bypass EIS – Technical Lead

Bill was the natural environment technical leader for this EIS. He supervised many tasks including preparation of methods and data reports, completion of wetland delineations, and implementation of innovative habitat and species impact analyses. His most recent role was a quality assurance reviewer.

ODOT, Statewide, Oregon **10/2003 to 10/2005**
OTIA III Environmental Baseline Reporting – Natural Resources Technical Lead

Bill was technical leader for natural resources for the baseline reports for over 400 bridge repair and replacement projects. He was responsible for coordinating report writing, contacting ODFW biologists, and determining impacts to listed species from construction-related activities. Bill was lead author of two biological assessments for implementation of mitigation activities in northwest Oregon.

WSDOT, Wapato, Washington **8/2000 to 9/2001**
Donald-Wapato Bridge Replacement – Biologist

Bill prepared technical reports and a draft BA analyzing the impacts on federally listed plant and wildlife species as a result of replacing a 3-span bridge over the Yakima River. Species analyzed included the bald eagle, Ute's ladies-tresses, and the mardon skipper.

Education:

School Name, City, State
University of Michigan, Ann Arbor
BS Biology, 1991

Portland State University, Portland
MS Candidate Biology, 1997

Lynn R. Halsey
Director of Operations, C-TRAN
1999-present

Responsible for the development of organization and operating plans, procedures, and goals; monitor and control performance of the Operations Department in conformance with objectives, plans, schedules, and budgets; prepare department budget; administer employee grievance process, including conducting hearings and follow-up action; provide supervision for professional and technical contract and non-contract employees, as well as supervisory personnel engaged in all phases of the department's activities, including on-street operations and short- and long-range planning.

Professional Experience:

C-TRAN, Vancouver, WA **1994 to 1999**
Manager, Customer Service/Security

Performed a full range of supervisory functions that included selecting/training personnel, planning workloads, promoting quality and division efficiency; managed customer comment program; provided oversight on pass sales, cash balances, bank deposits, and revenue processing; and developed and managed C-TRAN's security program to include oversight of all contracted security.

C-TRAN, Vancouver, WA **1989 to 1994**
Operations Supervisor

Responsible for the direct supervision of all transit service to include field supervision and performance evaluation of bus operators to ensure schedule and service compliance; planned and scheduled daily work assignments to ensure efficient utilization of personnel, facilities, and transit coaches; provided operator training, accident investigation, and route information; and developed security program to address the security concerns of patrons and employees.

Amtrak, Portland, OR **1984 to 1989**
Station Agent

Ensured that safety and security regulations were complied with at the 16th busiest station in the system (ranked #1 in express revenue); supervised and maintained payroll records for eight stations (34 employees); verified commissary supplies for all trains terminating in Portland; sold tickets and resolved passenger problems; interfaced with local media; arranged for charter buses to replace disrupted train service in emergency situation; monitored all station accounting; and compiled monthly statistical reports indicating revenue-to-cost ratios.

Education:

Concordia College, Portland, OR
B.S. in Business Administration, 1998

Columbia Basin Community College, Pasco, WA
Associate of Arts Degree, 1976

Jeff Hamm
C-TRAN Executive Director/CEO
2007-Present

Chief Executive Officer responsible for directing operations, maintenance, planning, administration and capital project development for public transportation services in urbanized Clark County, Washington with a population of 380,000. Reports directly to a nine member Board of Directors composed of city and county elected officials. Insures agency adherence to local, state, and federal law as well as to C-TRAN Board established policies and procedures. Oversees agency financial affairs, marketing and promotion activities and public involvement. Manages a work force of 400+ FTE employees, a $38 million annual operating budget and an $18.7 million capital budget.

Professional Experience:

Salem Area Mass Transit District, Salem, OR **1999 – 2007**
General Manager

Chief Executive Officer of the municipal corporation that provided public transportation services in the Salem/Keizer urbanized area with a population of 215,000. Reported to a seven member directly elected Board of Directors. Managed a workforce of 250+ FTE employees and contract personnel, a $19 million annual operating budget and $9 million capital budget.

Jefferson Transit Authority, Port Townsend, WA **1990 – 1999**
General Manager

Chief Administrative Officer of a municipal corporation that provided public transportation services in a rural community of 25,000 population. Reported to a five member Board composed of city and county elected officials.

METRO, Seattle, WA **1984 - 1990**
Supervisor

Managed sections within two separate divisions – Ridesharing Services (1984- 1986) and Research and Market Strategy (1986-1990).

City of Seattle, Engineering Department, Seattle, WA **1981 - 1984**
Planning and Development Specialist

Researched and wrote components to regional and local transportation planning documents.

Energy Transportation Alternatives: 2000, Seattle, WA **1979 - 1981**
Consultant

Co-founded a consulting firm which offered urban transportation planning services.

Education:

University of Washington, Seattle, WA
Masters in Urban Planning; 1978

Beloit College, Beloit, WI
Bachelors of Arts in Political Science; 1972

Accreditations:

University of Oregon, Eugene, OR
Pacific Executive Program Certificate; 2003

University of Washington, Seattle, WA
Cascade Public Executive Program Certificate; 1993

Scott W. Harmon, P.E.
Civil Engineer, David Evans and Associates, Inc.
1999-present

Mr. Harmon is a transportation analyst in DEA's Portland, Oregon, office. He is an experienced transportation planner, and traffic engineer, and he has been involved with projects in several western states, including Idaho, Washington, Oregon, and California. He has worked on transportation system plans, corridor studies, environmental impact statements, municipal and private development projects, and roadside safety evaluations. He has helped communities and regions to identify transportation needs using manual and computer model forecasts and developed projects and solutions to meet these needs. Mr. Harmon is skilled in analyzing survey data to determine trip generation rates, modal split, arrival/departure patterns, and intersection operations. He is also skilled in the design, calibration, application and presentation of traffic simulation models. Mr. Harmon prepared materials and provided training on the use of Synchro/Sim Traffic models to DEA employees from several offices.

Professional Experience:

Selected Transportation Project Experience:

Albany Transportation Center, for the City of Albany, Oregon
As part of the high-speed rail program for the west coast, this project involved the evaluation and recommendation of a site for the Albany Transportation Center (ATC). The ATC is a multi-modal site designed to serve high-speed rail, transit, pedestrians, bicyclists, and vehicle traffic. Mr. Harmon was lead traffic analyst responsible for evaluating key traffic issues associated with the redevelopment of the Albany Train Station.

BPA Ross Complex Traffic Analysis, for the Bonneville Power Administration, Vancouver, Washington
Due to heightened security concerns around the nation the Bonneville Power Administration (BPA) is evaluating changes to the existing roadway system within the BPA Ross Complex. DEA was responsible for identifying and evaluating several improvement scenarios. Mr. Harmon was the lead traffic analyst responsible for evaluating key traffic issues associated with the realignment of the roadway system within the BPA Ross Complex.

City of Portland Streetcar Extension (Harrison Street) for the City of Portland (sub to BRW), Oregon
Mr. Harmon was lead traffic analyst responsible for evaluating key traffic issues associated with the extension of Harrison Street across Front Avenue and Harbor Drive for the City of Portland streetcar and normal traffic. The street car will operate in the middle of the new and existing streets without special traffic signal preemption.

Henry Street Extension, for City of Beaverton, Oregon
The City of Beaverton is designing the extension of Henry Street, which will extend the planned Millikan Way extension from its terminus at Cedar Hills Boulevard east to connect with Beaver Dam Road at Watson Avenue. The purpose of the project is to forecast traffic volumes on the proposed Henry Street extension in the City of Beaverton for the planned opening year of 2002 and future year of 2015.

Willow Grove Road Transportation Study, for Cowlitz County, Washington
The project involved the collection, evaluation and mitigation of roadside hazards along the 7.5 miles of Willow Grove Road. Mr. Harmon was transportation analyst responsible for collection, analysis, and reporting of roadside hazards associated with the Willow Grove Road transportation study.

Fernan Lake Road Traffic Analysis, for the Federal Highway Administration (subbed to Druyvestein, Johnson and Anderson), Coeur D'Alene, Idaho
Approximately 17 kilometers of the existing Fernan Lake Road, located just east of Coeur D’Alene, Idaho, is being designed for reconstruction to rural major collector standards as outlined in the Kootenai County Transportation Plan. Mr. Harmon served as a transportation analyst responsible for collecting analyzing crash information for the roadway and identifying problem locations.

Education:

University of Washington, Seattle, WA
B.S., Civil Engineering, 1997

Accreditations:
Professional Civil Engineer, Oregon (70839PE), 2007

Michael Harrison
Planner IV
2005-present

Michael's current CRC related assignments include preparing summaries of public comments received by the project office, responding to comments received during the formal 60-day Draft EIS comment period, and performing research and writing in support of technical memorandums and the production of the Final EIS.

Professional Experience:

Parametrix, Portland, Oregon **4/05 to Present**
Planner IV

Michael provides project management; land use, transportation, and environmental planning; and public involvement services to public and private clients. Michael also supervises three Parametrix employees.

City Commissioner Jim Francesconi, Portland, Oregon **11/00 to 12/04**
Press and Planning Policy Assistant

Michael was involved in all phases of transportation project development, from organizing and facilitating citizen meetings to building consensus with agency staff and elected officials. He also developed and implemented communications programs for the commissioner, including writing speeches and articles, speaking on his behalf, organizing press conferences, and cultivating relationships with newspaper, radio, and television reporters.

Congressman Earl Blumenauer, Washington, D.C. **5/96 to 10/00**
Legislative Director

Michael developed and managed the Congressman's overall legislative agenda. His responsibilities included managing the Congressman's legislative staff, crafting legislative bills and amendments, and building coalitions of elected officials and interest groups to ensure their passage.

City Commissioner Earl Blumenauer, Portland, Oregon **4/93 to 4/96**
Commissioner's Assistant

Michael acted as liaison between the City of Portland's Transportation Bureau and the Commissioner's Office and was responsible for policy analysis of urban planning and issues.

Education:

Portland State University, Portland, Oregon
MS, Urban and Regional Planning, 1998

Pacific Lutheran University, Tacoma, Washington
BA, Political Science, 1992

Thomas Heilig, P.E.
Systems Engineering Director, TriMet
1992-present

Strong engineering background and management experience in rail transit system planning, construction, testing and operation. Experience with all aspects of rail vehicle design, manufacturing, testing and operation. Systems integration skills including traction electrification, railway signaling and communication systems to operational and maintenance issues. Project management experience with large procurement and construction contracts.

Professional Experience:

TriMet, Portland, OR **1992 to present**

Systems Engineering Director **2007-present**

Lead and direct TriMet Systems Engineering Department. Responsible for planning, design construction and procurement of systems elements for all rail projects, including IMAX, South Corridor, Commuter Rail, and future extensions. Provide systems engineering support to rail operations and Central City Streetcar.

Systems Engineering Manager **2000 to 2007**

Manage systems engineering design, construction and manufacturing activities for all TriMet MAX light rail projects, including the Interstate MAX Light Rail Project, the Airport extension of the MAX light rail system, coordination with the Central City Streetcar project and operations support of the integrated East/West MAX light rail line.

Resident Engineer, Light Rail Vehicles **1992 to 2000**

Project Manager responsible for all aspects of the procurement of 46 low floor light rail vehicles for TriMet's integrated East/West light rail line. Includes project management, specification development, engineering and design review, construction management, testing, systems integration, follow-on engineering and revenue service support.

Provided vehicle engineering and systems integration for Westside MAX Light Rail PE, including level boarding study resulting in TriMet's decision to procure the first low floor light rail cars in North America. Developed design criteria, performed simulations and wrote computer programs to evaluate performance of Light Rail Vehicles. Analyzed issues related to rail operation on steep gradients and prepared report.

Project Manager responsible for all aspects of the procurement of 4 Vintage Trolley Rail Cars for operation on TriMet's Banfield Light Rail Line through all phases of the project.

Vehicle engineer for Type 1 Light Rail Cars, providing engineering, testing and inspection support during commissioning through final acceptance and operation start-up of the Banfield Light Rail System. Also provided engineering support for cars in revenue service. Performed various tests of Light Rail Vehicles, designed equipment modifications for Light Rail Vehicle systems.

Education:

Oregon State University, Corvallis
M.S. in Electrical Engineering, 1984

Technische Universität Stuttgart, Germany
Vordiplom in Electrical Engineering, 1980

Accreditations:
Professional Engineer, Oregon

Jeff Heilman
Principal Consultant and Director of Environmental Performance Excellence Program
2002-present

Jeff has 20 years experience conducting planning, analysis, and environmental compliance for transportation projects and other facilities. He has helped clients complete alternatives analysis, feasibility studies, NEPA and state and local requirements for light rail transit, bus rapid transit, interstate highways, bridges, trails, state and local roadways, freight rail, aviation and marine facilities. He has specialized in developing innovative approaches to effectively integrate environmental issues and other factors into transportation planning and project delivery. He has served as expert reviewer for transportation projects, bringing expertise in NEPA and environmental review. His work has received national awards from FHWA for Environmental Excellence, from AASHTO for Best Practices in Context Sensitive Solutions, from the Project Management Institute and the American Planning Association.

Professional Experience:

Parametrix, Inc. **11/1989 to present**
Planner I, Planner III, Senior Planner, Division Manager, Principal Consultant and Director of Environmental Performance Excellence Program

Other positions include: Planner, City of Santa Monica, CA; Planning consultant (self-employed); Planner, San Agustin, Philippines; Community Development Trainer, US Peace Corps; Research Assistant, University of Southern California; Research Technician, Western Washington Research and Extension Center.

Selected Transportation/Environmental Project Experience

- *Oregon Statewide Bridges Environmental Program, Oregon DOT.* Managed development of new environmental approach for evaluating and permitting replacement and repair of over 300 bridges throughout Oregon. New approach addressed ESA, CWA 404 and 401, Section 106, NEPA and other regulations. Construction complete on first phases.
- *Central Link LRT EIS, Seattle to Tukwila, WA, Sound Transit.* Managed the EIS for proposed new LRT system in Seattle, WA, and provided quality control on the EIS for a new system in Tacoma, WA. The Tacoma line is in operation and the first phase of the Central Link system is under construction. Provided quality review and strategic input on NEPA and permitting for subsequent studies.
- *South/North LRT DEIS, Portland Metro.* Led consultant team preparing Draft EIS for the proposed South/North light rail transit (LRT) corridor. This 22-mile, $2.4 billion LRT project was proposed to extend from Clackamas County, Oregon, to Vancouver, Washington. First phase of corridor (Interstate MAX) opened in 2004.
- *BRT Phase I NEPA EA, Eugene, OR, Lane Transit District.* Managed preparation of the NEPA compliance for a proposed new bus rapid transit (BRT) line between downtown Eugene and downtown Springfield – one of ten original national demonstration projects. Project in operation.
- *Hillsboro LRT EIS, Portland Metro.* Managed the consultant team preparing the EIS for the extension of Portland's MAX system to Hillsboro, a six mile corridor extending to the rapidly developing "silicon forest" area west of Portland, Oregon. This line was constructed and has been operating since 1998.
- *Springfield Transit Station EA, Springfield, OR, Lane Transit District*
- *Interstate MAX LRT Final Design, Portland, OR*
- *Portland State University Transit Center EA, Portland, OR, Tri-Met*
- *Central Oregon Bridges / Jonesboro Section EA and BA, Malheur County, OR*
- *OR 126 Glacier Highland EA, Redmond, OR, Oregon DOT*
- *US 97 Redmond Reroute EA, Redmond, OR, Oregon DOT*
- *87th Avenue Extension EA, Vancouver, WA*
- *Multiple papers and conference presentations, including: Led climate change workshop, TRB summer meeting 2008; Presentation on environmental performance standard, TRB annual meeting, 2007; Presentation on conducting co-led FTA/FHWA NEPA project, ICOET conference, 2007; Presentation on environmental stream-lining in transportation, TRB summer meeting, 2006; taught environmental streamlining course, NAEP, 2006*

Education:

University of Southern California, Los Angeles, CA
Master of Planning, 1989

Washington State University, Pullman, WA
B.S., Biology, cum laude, 1983

Maurice Hines
Consultant Communication and Outreach Coordinator
2008-Present

Maurice supports outreach strategies and materials production for the Columbia River Crossing communication's team. He coordinates public involvement and notification of upcoming events, and talks with the public at outreach events. Maurice drafts written materials for the public including folios, postcards, press releases and web site material. Maurice also drafts and tracks responses to written public questions and coordinates updates to the project web site.

Professional Experience:

Maurice has three years of experience in writing for the media, graphic design, event coordination and customer relations. His broad range of volunteer and work roles have equipped him with strong skills in writing, interviewing, public speaking, advertising design and event logistics. He has worked at EnviroIssues for one year as a Project Coordinator, putting to use an eye for fine details and the ability to effectively manage time and support multiple projects.

HiCORP, Tulsa, Oklahoma **2006 to 2007**
Assistant Programs Coordinator

Managed advertising specialties, point of purchase advertising and warehouse fulfillment for Tracker Boats, Skeeter Boats, G3 Boats, ConocoPhillips, Rheem and their collective 12 subsidiaries. Developed marketing strategies to increase web based sales. Planned and graphically designed various promotional materials including brochures, order forms, catalogs, direct mailers and email advertisements. Maintained client stock inventory through monitoring of web based product sales and negotiating contracts for production with various vendors. Administrated client web sites by writing site text, photographing products, writing product descriptions and creating graphics.

Education:

Oral Roberts University, Tulsa, Oklahoma
B.A., Mass Media Communications with emphasis in Public Relations and Advertising, 2006

Accreditations:
Member, Women's Transportation Seminar (WTS), Portland Chapter, 2008-Present

Dann Horowitz
Consultant Project Assistant, DEA Inc.
01/2008-present

As the consultant project assistant, Dann is the main point of contact between WSDOT, ODOT and governmental agency and the subconsultant staff. His duties include: calendar, schedule, meeting and event coordination; contract work including subconsultant agreements, primary contract amendments, and rental agreements; creation and submission of monthly invoice to client; mediation and negotiation between governmental client and consultant staff; assembly, formatting, proofreading and editing of correspondence, meeting materials and agendas; and other administrative duties, including purchase orders, check requests, general office duties.

Professional Experience:

Robert Half International, Portland, OR **03/07 to 01/08**
Administration / Sales Support Manager

Manage staff of 8, including sales support and front office employees; oversee office operations and administration management; conduct training, hiring, reviews, coaching and staff development; administrative, operational and sales support to senior management; client and customer service, event planning, marketing support.

PricewaterhouseCoopers LLP, Toronto, Ontario, Canada **09/03 to 11/06**
Editor / Editorial Assistant

Database / content management responsibilities - assembly, formatting, editing, proofreading; marketing - strategy and process creation, production, management and execution of initiatives; created, built and maintained client relationships; client support to external/internal clients; main contact for incoming queries; preparation of marketing / media / distribution plans and proposals / execution of presentations; client list maintenance for mailings, management of client information, tracking, invoicing.

Poolia Parker Bridge, London, UK **07/01 to 05/03**
Void Officer; Financial Control Assistant; Accounts Payable Assistant; Costing Assistant

Reporting & statistical analysis ensured tracking of properties & minimum loss of rental income; increased efficiency of procedures - reduced overall turnaround time for properties by over 25%; responsible for processing & payment of invoices; recorded checks/cash received for payment; update and maintenance of project accounting system, including forecasts, staff and salary data.

Axiom Electronics, Inc., Portland, OR **10/00 to 06/01**
Administrative Assistant to CFO

Handled petty cash, invoicing, collections & A/R, month and year-end closing, financial analysis; customer support, sales and marketing related support, quarterly surveys, reception.

Commercial Information Bank of Canada, Montreal, Quebec, Canada **06/96 to 07/99**
Team Lead / Account Executive

Handled new / existing accounts, resolved customer service queries; customer service related questions and problem resolution.

Education:

McGill University, Montreal, Quebec, Canada
Bachelor of Arts, 2000

Zachary Horowitz
Consultant Transportation Planner
2006 – Present

Consult the Columbia River Crossing project as a member of the traffic engineering and transportation planning team. Work includes transportation planning, traffic engineering, pedestrian and bicycle planning, freight planning, and traffic safety analysis.

Professional Experience:

David Evans and Associates, Portland, Oregon **4/06 to current**
Transportation Planner

Work as a transportation planning and traffic engineering consultant on the $4.2 billion Columbia River Crossing project. Tasks include: traffic model development and analysis, environmental impact statement and technical report writing, pedestrian and bicycle planning, transportation planning, presentation of technical findings, traffic safety analysis, cartography and graphic design, public outreach, transportation research, and data collection. Currently serve as a member of several interagency, multi-disciplinary committees. Assist with transportation marketing and business development efforts. Organize and lead transportation student outreach events.

Portland State University, Portland, Oregon **1/05 to 4/06**
Graduate Research Assistant and Master's Student

Co-author of several transportation research reports along with principal investigators. Research projects included: freight railroad analysis, traffic capacity analysis, automated truck data collection techniques, and transportation safety. Student leadership activities included serving as secretary and webmaster for the Students in Transportation Engineering and Planning club, co-organizer of 2006 Transnow Student Conference, and fundraising coordinator for 2005 ITE District 6 Annual Meeting. Original research was accepted for and presentations were made at the Transportation Research Board Conference in 2007, Institute of Transportation Engineers yearly district meetings, the 12th World Congress on ITS, and the Transnow Student Conference.

Lattice Semiconductor Corporation, Hillsboro, Oregon **3/02 to 1/05**
Webmaster

As webmaster, primary role was to develop, upgrade and maintain several corporate website including www.latticesemi.com, internal corporate intranet, sales extranet, and foreign corporate (Korean & Japanese) websites. Work included web application and database development. Responsible for creating and analyzing Internet visitor traffic patterns and usage statistics. Managed and administered web servers. Organized and managed internal and external online training and informational product seminars. Worked with marketing, strategic planning and software groups to transform business needs into web applications.

Education:

Portland State University, Portland, Oregon
Master's of Science, Civil and Environmental Engineering (Transportation Specialization), 2007

McGill University, Montreal, Canada
Bachelor of Arts, Geography (Urban Systems), 1997

George C. Humphrey
Agreements Engineer, TE 3
2007-present

Serve as the agreement specialist and consultant liaison for the Columbia River Crossing Project.

Professional Experience:

WSDOT, Vancouver, WA **1998 to 2007**
Agreements Engineer, TE 3

- Act as Region Utility Engineer in his absence. Supervise and manage the Negotiations, preparation and administration of agreements.
- Provide counsel to key offices within the Region.
- Formulate agreements with utility companies, local agencies, developers and private parties for work to be performed within State right of way and establish reimbursement for State expenses associated with the work.
- Interface with project offices to ensure that utility companies are notified of proposed highway construction projects.
- Supervise the formulation and execution of service agreements, utility permits and franchises, permits for access and general permits.
- Serve as the Region Consultant Liaison. Assist in the preparation of RFP/RFQ and write advertisements. Prepare Task Orders and amendments. Participate in the MPD process. Review billings for correctness. Participate in the consultants' evaluation. Track the agreements for time and money.

WSDOT, Vancouver, WA **1985 to 1998**
Agreements Engineer, TE 2

- Prepare and process agreements and other legal documents that cover the WSDOT involvement with utility companies, local agencies, developers and private parties.

WSDOT, Vancouver, WA **1985 to 1989**
Transportation Technician

- Perform design and estimates for construction projects. Performed construction inspection, materials testing, drafting and survey.

Barb Hutchinson
Project Controls Assistant
2006 – present

Barb is part of the Project Controls Team and is responsible for managing the ongoing electronic document control system, monthly progress reporting, Prolog database administration, tracking the status of project deliverables, technical editing, and oversight of all project records.

Professional Experience:

Barb Hutchinson, a project administrator with Parsons Brinckerhoff (PB), has extensive experience in project administration, technical editing, and office management. She has an excellent eye for detail and is skilled in managing and tracking the multitude of data inherent in today's fast-paced business environment. She has worked as a PB consultant for the past 10 years, and in the engineering field for 19 years.

ODOT and WSDOT Joint Owners, Vancouver, Washington **2006-present**
Columbia River Crossing Project

Project Controls Assistant responsible for tracking deliverables and maintaining over 100,000 electronic project files. Using complex procedures, Barb identifies and categorizes project files to ensure accurate project records and a rapid retrieval process. She produces the monthly Consultant Progress Report, including deliverable and cost reporting, and co-facilitates monthly deliverable coordination meetings with each Task Manager. She also assists with training, supervision, and document preparation as needed.

Parsons Brinckerhoff, Portland and Salem, Oregon **1998 to 2006**
Ports and Marine Technical Resource Center

Administrator responsible for office support for the local Ports and Marine office and the national Technical Resource Center. Barb produced and tracked marketing documents, prepared resumes, coordinated pursuits, and assisted with planning, organization, and office management, delegating tasks to administrative staff as needed.

ODOT Design Build – Program Management

Office manager for project which included several large work order contracts. Responsible for office setup, organization, and operation. Barb's duties included general administration, working with vendors, setting up accounts, tracking and processing accounts payable, purchasing and organizing supplies, scheduling, document control, word processing, and general office duties.

Bonneville Power Administration (BPA) – Schultz-Hanford EIS

Editor responsible for the general editing and formatting of the Schultz-Hanford EIS for a proposed new power line.

Marketing Coordinator

Responsible for preparing proposals, including coordinating with team members, document layout, editing, formatting, proofreading, and final production. Barb's duties also included preparation of other marketing materials such as project descriptions, resumes, and cut sheets.

Land Use/Planning Department, Portland, Oregon

Administrator responsible for office support. Barb assisted the Director with scheduling, correspondence, reports, and general office support.

Administrator

Responsible for document preparation, editing, and formatting numerous engineering reports, manuals, studies, specifications, style manual, office templates and forms, and correspondence. Provided training and guidance for administrative and human resources staff, archiving, accounts payable, document control, word processing, and HR tasks. Barb has experience in technical editing, training, and administration. Her strengths lie in editing, coordination, communications, administration, and teaching.

Yin Lwin Hwee
Landside Structures Design Lead
2009-present

As the Landside Structures Design Lead, Mr. Hwee is responsible for design development of landside bridges and retaining walls from concepts to construction documents. The landside bridges and retaining walls are located on the Marine Driver Interchange, bridges over the North Portland Harbor, bridges and retaining walls on Hayden Island, bridges on the SR14 Interchange, and bridges and retaining walls along I-5 from SR14 to SR500 on the Columbia River Crossing project.

Professional Experience:

David Evans and Associates, Portland, Oregon **3/09 to Present**
Job Title: Senior Bridge Engineer, Project Manager

Job Description: Mr. Hwee is responsible for delivery of landside bridges on the Columbia River Crossing project in Oregon and Washington

CH2M Hill, Portland, Oregon **4/01 to 2/09**
Job Title: Senior Bridge Engineer, Project Manager, Bridge Operations Manager

Job Description: Mr. Hwee was responsible for delivery of bridge projects to clients in Oregon, Washington, Idaho and Montana.

Oregon Department of Transportation, Salem, Oregon **6/85 to 3/01**
Job Title: Bridge Design Engineer, Bridge Engineering Manager

Job Description: Mr. Hwee was responsible for design development of bridge projects and management of bridge engineering staff

Education:

Willamette University, Salem, Oregon
M.B.A.

Oregon State University, Corvallis, Oregon
B.S.,

Accreditations:
Registered Professional Engineer in the State of Oregon, Washington, Idaho and Montana.

Andy James
David Evans & Associates, Senior Designer
2007-present

My current duties are as the lead staging designer for the Columbia River Crossing project. Previous duties included preliminary route investigation for SR-432 in the Longview Industrial area and preliminary design work on I-5 for the Mellen to Blakeslee improvement project.

Professional Experience:

James Engineering, Vancouver, WA **9/1991 to 1/2007**
Engineering Technician

My duties at James Engineering consisted of:

- Design and preparation of engineering plans for streets, storm drainage, water systems and sewer systems
- Preparation of stormwater calculations and reports
- Prepared code compliant site plans & subdivision plats
- Research of property boundaries and input data into AutoCAD
- Calculate and balance cuts & fills for developments and generate final grading plans & contours
- Preparation of land use applications, documents and exhibits for submittal to Clark County and the City of Vancouver
- Assisted in obtaining project approvals from lead agencies
- Managed accounts payable and receivable

Education:

1988 – 1990: Clark Community College, Vancouver, WA
1990 – 1991: Washington State University, Pullman, WA
1992 – 1993: Clark Community College, Vancouver, WA
Major: Engineering

Wesley A. King
Columbia River Crossing Deputy Transit Project Manager
2009-present

Wesley supports the Columbia River Crossing (CRC) Project as the Deputy Transit Project Manager for the day-to-day management of the transit team. Additional responsibilities include the oversight of the Road Map to Final Design, scheduling, community outreach within the City of Vancouver, and agency coordination. He is also the CRC representative for the Vancouver Transit Advisory Committee, and Transit Oriented Development Committee.

Professional Experience:

Detroit Department of Transportation (DDOT) Detroit, MI **7/2007 to 9/2009**
Transit Planner/Project Manager

As a Transit Planner/Project Manager Wesley was responsible for implementing new gateway express route through coordination with the Suburban Mobility Authority for Regional Transit (SMART) and the Michigan Department of Transportation (MDOT), including Southeast Michigan's first HOV lane Assistant Project Manager for the Detroit Transit Options For Growth Study (DTOGS) Alternatives Analysis; this study identified Woodward Light Rail as the LPA. He was also Project Manager for the Downtown Alignments for the DTOGS study and for the Rosa Parks Transit Center bus route realignment accommodating a new facility and improved access to routes circulating throughout the city. Developed an all encompassing 5 Year Plan for the City of Detroit Department of Transportation including, express service, dedicated bus lanes, bike policies, expanded service into suburban communities, etc… Participated in citywide Project Management Teams, Advisory Committees, Customer Service Representation meetings, and Technical Committees, also represented DDOT at Regional and Federal workshops. Developed new initiatives for accommodating special events in Downtown Detroit including, Lions Games, Thanksgiving Day Parade, and the yearly fireworks display. City advocate for Transit Oriented Development, Non-Motorized Investment, and Smart Growth; secured grants for implementation of bike racks on all DDOT coaches and system expansions.

Michigan Department of Transportation (MDOT) Southfield, MI **11/2004 to 7/2007**
Transportation Planner

During his time at MDOT Wesley analyzed comments from the public in the M-1/M-102 Study and the I-75 Planning/Environmental Study. He participated in the non-motorized advisory committee to promote connectivity while continuing integration and promotion within new and existing developments, and analyzed traffic and pedestrian movement for M-85. Prepared and reviewed MDOT comments to Detroit's Downtown Transportation Master Plan. Wesley attended public meetings for coordination of prospective developments and informational meetings for M-1/M-102 and the Detroit River International Crossing (DRIC). Participated in preparation of RFP in consultant selection for combating the Emerald Ash Borer and reviewed and commented on submitted proposals. Worked with designers to ensure road development projects implemented more prominent Greenways. Conducted, researched, and prepared Project Area Contamination Surveys (PACS). Informed the public and accepted feedback for developing the future goals and objectives of Michigan's long-range transportation plan and through intensive public participation worked to develop a comprehensive plan for the community of Delray in southwestern Detroit Completed and utilized training in CSS (context sensitive solutions)

Education:

Wayne State University, Detroit, MI
MURP Program, 2009

Western Michigan University Kalamazoo, MI
Bachelors Degree Geographic Information Systems/Urban and Regional Planning, 2001

Roger Kitchin, MBA
Consultant Team Cost Estimate, Stormwater & Utility Lead
2004-present

Roger provides the leadership for developing capital cost estimates, stormwater management, and utility relocation planning. He brings over 35 years of diverse engineering and management experience to the team. Roger has forged strong working relationships with utility owners and developed a stormwater management plan that was well-received by NOAA Fisheries. He was also instrumental in developing an approach to the capital cost estimate that has proved flexible enough to meet the needs of FTA and FHWA.

Professional Experience:

CH2M HILL, Bellevue, WA — **2001 to Present**
Senior Water Resource Consultant

Responsible for water resource and utility aspects of a number of transportation and municipal projects. Relevant projects include the Pine Street LRT Stub Tunnel for Sound Transit. Work on that project included drainage and utility relocation in a highly congested part of downtown Seattle. In addition, Roger was the QA/QC Manager for the final design of the $250 million Brightwater Wastewater Treatment Plant.

Nanshe Consultants Ltd., Calgary, AB Canada — **1998 to 2001**
President
Klohn Crippen Consultants Ltd., Calgary, AB, Canada & Indonesia — **1990 to 1998**
Project Manager & Technical Lead
Saskatchewan Water Corporation, North Battleford, SK, Canada — **1988 to 1990**
Manager, Northwest Region
Cochrane Lavalin Inc., Regina, SK, Canada — **1984 to 1988**
Project Manager
Montreal Engineering Co. Ltd, Vancouver, BC & Calgary, AB, Canada — **1977 to 1984**
Project Manager & Design Engineer

Responsible for numerous water resource projects in North America and overseas, three of which involved multi-billion dollar facilities. Work included the preparation of bid documents, and developing project cost estimates. During this period, Roger garnered a reputation for developing solutions to complex problems.

Yorkshire Water Authority, York, Great Britain — **1975 to 1977**
Designer & Construction Supervisor
Sir William Halcrow & Partners, London, Cardiff & Rhayader, Great Britain — **1972 to 1975**
Designer

Worked on several water resource projects and structural design of a road bridge and deep sea oil platform.

Education:

University of Calgary, Calgary, Alberta, Canada
M.B.A., 1999
University of Birmingham, Birmingham, Great Britain
B.Sc., Civil Engineering, 1st Class Honors, 1972

Accreditations:
Life member, Association of Professional Engineers, Geologists and Geophysicists of Alberta (Canada)
Formerly registered as a professional engineer in British Columbia, Alberta and Saskatchewan (Canada)

Tom Klinkel
Manager of HCT Operations (Part-Time)
2009-present

Tom Klinkel will provide bus service planning for the project. He has extensive knowledge of C-TRAN bus routing, operations and long range planning. In cooperation with CRC, TriMet, and City of Vancouver Staff, Tom will develop bus transit service plans for the interface between C-TRAN service and the light rail project.

Professional Experience:

C-TRAN Clark County Public Benefit Authority **2009-present**
Manager of HCT Operations (Part-Time)

Performs as C-TRAN's primary contact with the CRC Project on bus operations and its interface with LRT in Vancouver. Participates in a variety of meetings and CRC committees that relate to modeling and assumptions made for C-TRAN bus service levels.

C-TRAN Clark County Public Benefit Authority **1994 to 2008**
Manager Operation Services

Manage operations planning, safety and training.

Operations planning responsibilities include overseeing route development, scheduling, service stop locations, run cutting, special service, and operations technology.

Safety responsibilities include overseeing operations safety program, accident investigation, determining accident responsibility, operator counseling, and safety training.

Operations training responsibilities include new operator training for fixed route and paratransit operators and follow up training as needed.

TRANS 360, Inc, Gresham, Oregon **1990 to 1993**
General Manager

Manage the day to day operation of company services and training programs. Included are the development of transportation related training programs, research and interpretation of state and federal laws and regulations, instruction of defensive driving courses, providing USDOT audits and training, and providing legal expert witness services.

U. S. West Business Resources, Inc (Formally Pacific Northwest Bell) **1967 to 1990**
Field Area Operations Manager

Manage mail and material delivery and warehouse functions for Washington, Oregon and Northern Idaho. Other functions included new product introduction, product life cycle management and major project management.

Education:

University of Washington, attended engineering school
University of Puget Sound, attended engineering school

Jim Koloszar
Biologist/GIS Analyst
2007-present

Jim supports the environment and natural resources teams by providing technical expertise in Geographic Information Systems (GIS) and data management. He supports various disciplines in map and figure development for field work and reports. He works with other teams (e.g. design, transit, communications, etc.) to coordinate data needs and management of spatial data sets, as needed.

Professional Experience:

Parametrix, Natural Resources Division, Portland, Oregon **10/2005 – present**

Biologist: Perform scientific environmental studies in the office and field through application of standard techniques, procedures and criteria.

GIS Analyst: Operate and maintains a GIS workstation to implement analyses and generate map products for a variety of projects. Assist in ensuring consistent, effective, and efficient GIS operations.

Oregon Department of Fish and Wildlife, **07/2002 to 10/2005**
Fish Division, Ocean Salmon and Columbia River Programs (OSCRP),
Columbia River Investigations (CRI)
Natural Resource Specialist/Experimental Biologist Aid

Assist in stream studies to determine general habitat types and, using backpack electrofishers, determine fish species composition.

Turnstone Environmental Consultants. Inc. **05/2001 to 06/2001**
Wildlife Biologist

Provided expertise as needed for wildlife surveys throughout northern Oregon and southern Washington. Projects included surveys to catalogue plant and animal species on a proposed wind farm site near Pendleton, Oregon (May 2001) and surveys for amphibians on the Gifford Pinchot and Mt. Hood National Forests (June 2001).

The Nature Conservancy of Texas, **03/1994 to 04/2001**
Fort Hood Cooperative Research Program
Senior Conservation Biologist

Supervised, designed and conducted field studies and surveys in support of endangered species projects and provided assistance in the development of long-term management and protection plans for the black-capped vireo on Fort Hood, Texas.

Education:

Purdue University, West Lafayette, Indiana
B.S. Wildlife Science, 1989

Portland State University, Portland, Oregon
Graduate Certificate, Geographic Information Systems (GIS), 2005

Alan Lehto
Director of Project Planning
Capital Projects & Facilities Division
2008 – Present

As the Project Planning Director, Alan's duties include directing the District's transit systems and facilities capital planning activities. Directs and supervises staff managing planning and design for major transit capital projects, park and ride and bus capital projects, and land development. Directs major corridor planning activities from conceptual planning, alternatives analysis, preliminary and final environment studies and hand-off for final design. Represents TriMet on regional planning and coordinating committees. Supports the 5-Year Transit Investment Plan and Facilities Master Plan. Coordinates the capital development program with service, customer information and development activities. Supports special projects in support of District or partner agency initiatives.

Professional Experience:

TriMet, Portland, Oregon **2001 to 2008**
Manager of Transit Corridor Planning

Manage planning and analysis of transit corridor projects from concept design phase through preliminary engineering. Manage tasks and analysis for unique challenges, such as integrating operations and capital needs for corridor transit projects, through Final Design. Lead coordination with Metro for NEPA processes on major transit projects. Directs and supervises staff and consultants and related planning activities. Coordinates with other jurisdictions that may have lead or support roles.

TriMet, Portland, Oregon **1999 to 2001**
Planner II / III

Perform all activities associated with professional long and short range transit capital projects. Lead for Streamline, bus efficiency and amenities improvement project, on multiple frequent service lines throughout the district. Develop, implement and analyze complex analyses in support of various capital projects and facilities. Coordinate with other jurisdictions. Represent TriMet in various regional coordination and public venues.

Nelson/Nygaard, Portland, Oregon **1995 to 1999**
Associate Project Manager / Associate

Managed projects and complicated tasks for various projects. Responsible for transit research, data collection and analysis, planning, map generation, graphics and report production. Project manager or deputy project manager for plans and studies for transit systems across the west coast and throughout the west. Areas of emphasis included short- and long-term service planning, capital facilities and projects planning, financial analysis and planning, and governance and institutional structures.

Education:

Portland State University, College of Urban and Public Affairs, Portland, Oregon
Master of Urban and Regional Planning, 1997

University of Rochester, Rochester, New York
Coursework in Economics and Architecture (no degree), 1994

University of Wisconsin, Madison, Wisconsin
Masters, Personality & Social Psychology, 1992

Cornell University, Ithaca, New York
Bachelors, Psychology, 1991

Ryan LeProwse, P.E.
Consultant Transportation Engineer
2005 – Present

Mr. LeProwse has led the transportation team in support of the EIS for the Columbia River Crossing project for both states of Oregon and Washington. He has worked on traffic simulation for freeway and local street operations and has coordinated with design engineering staff on different designs. He has developed traffic forecasts for different alternatives and different toll rates. Mr. LeProwse has presented and supported DOT staff with presentations, reports, findings, and public outreach events.

Professional Experience:

David Evans and Associates, Inc. **1999-present**

Mr. LeProwse has over nine years of experience as a senior transportation engineer and planner for David Evans and Associates, Inc. He has been involved with projects in several western states, including California, Colorado, Idaho, Montana, Oregon, and Washington. He has worked on corridor studies, transportation system plans, environmental impact studies, municipal and private development projects, and urban design plans. He has helped communities and regions to identify transportation needs using manual and computer model forecasts and developed projects and solutions to meet these needs. Mr. LeProwse is skilled in analyzing survey data to determine trip generation rates, modal splits, arrival/departure patterns, and intersection operations. He is also skilled in the design, calibration, and presentation of traffic simulation models including Synchro/SimTraffic.

Selected Transportation Project Experience:

I-205 Mill Plain to 18th Street, WSDOT, Vancouver, Washington
Mr. LeProwse was a transportation engineer for this project that involved adding a new access to I-205 north of Mill Plain Boulevard and south of SR 500 in Vancouver, Washington. In addition to the analysis his responsibilities included writing the transportation report, meetings, and presenting findings to staff and public.

Delta Park-Lombard Widening, ODOT, Portland, Oregon
Mr. LeProwse was the lead transportation analyst for this project that involved the widening of southbound I-5 to three lanes between Victory Boulevard and the Columbia Boulevard southbound on-ramp. Mr. LeProwse was responsible for all areas in support of the EIS for the Delta-Lombard project

Lake County Transportation System Plan, ODOT, Lake County, Oregon
Mr. LeProwse was the transportation analyst for the Lake County Transportation System Plan. Responsibilities included data collection, inventory existing transportation facilities, analyze existing and future roadway and intersection operations, assess accident and safety concerns, identifying improvements to existing rural and urban transportation infrastructure, and review of concurrence with governing state and local design and operational guidelines. Additional responsibilities included writing the technical report, creating report graphics, both of which could be understood by a wide and primarily non-technical audience. The transportation system plan addresses each mode of transportation and provides an overall implementation plan.

I-5 Trade Corridor Study, Phase II, ODOT & WSDOT, Portland, Oregon
Mr. LeProwse was the lead transportation analyst for this project. In addition to initial design screening his responsibilities included compiling reliable input data for the simulation model, calibrating the model to replicated known corridor operating conditions, applying the calibrated model to the preferred alternatives, and analyzing the simulation results.

Education:

University of Portland, Portland, Oregon
B.S. Civil Engineering, 1999

Accreditations:
Professional Engineer in Washington and Oregon

Casey Liles, MSCE, PE
Highway Engineering Manager
August 2008-present

This position reports to the Assistant Deputy Project Director and is responsible for the day to day management of the Highway Engineering Team. The team includes approximately 40 employees including consultants and WSDOT and ODOT employees with the goal of delivering a project on time and within budget with a fundable and constructible outcome. This requires close coordination with the Environmental, Transit, Traffic, and Communications Teams as well as ODOT, WSDOT, FHWA of Oregon and Washington, FTA, Cities and Ports of Portland and Vancouver, RTC, Metro, Tribes, C-TRAN, Tri-Met, and other stakeholders.

This position is responsible for delivering the WSDOT and ODOT design and construction program within the CRC area and is responsible for strategic planning and leadership necessary to ensure the successful delivery of area transportation design and construction.

Professional Experience:

WSDOT, Vancouver and Kelso, WA **9/01 to 8/08**
Area Engineer (4 years) and Assistant Area Engineer

Responsible for delivering the state design and construction program in planning, leading, organizing, and controlling the work performed by the office. Assure all assigned projects are completed within scope, on schedule, and within budget. Responsible for the continuous coordination of all elements of the project's development process with regional maintenance and support offices, HQ Bridge, HQ Hydraulics, HQ Project Development, FHWA, HQ Planning, permitting agencies, and consultants. Plan, monitor, and manage all location activities on all assigned projects including consultant work. Assure that all standards, policies, and procedures are followed during the project development phase. Represent WSDOT to other agencies, the public, and the media. Manage as many as 50 employees including technicians, engineers, and secretaries.

WSDOT, Vancouver and Olympia, WA **6/99 to 9/01**
Systems Planning Manager (1 year) and Assistant Systems Planning Engineer

Managed planning engineers in updating the 2003-2022 Washington Transportation Plan (WTP) and Highway Systems Plan (HSP). Coordinated and communicated with a wide variety of transportation partners including 1) internally: maintenance, program management, design, construction, environmental, agency executives; and 2) externally: cities, counties, regional transportation planning organizations, tribal nations, consultants, and the public. Recommended analysis procedures and conducted analysis for the implementation of highway planning legislation. Reviewed route development plans for technical accuracy and to insure alignment with department policy and the WTP and HSP update process. Used GIS technology to analyze, map, and communicate system level data and performance. Coordinated with six WSDOT regions to prepare and present the Highway System Plan document, briefing papers, technical information, and other presentation materials to the Commission and WSDOT executives.

WSDOT, Mercer Island and Bellevue, WA **5/93 to 6/99**
Project Inspector/Designer

Inspects and directs the inspection of roads, structures and related items; may serve as lead inspector, act as roving inspector, or may inspect specialized features such as major structures, illumination systems, electrical systems, signal systems or enclosed drainage systems; analyzes and interprets plans and specifications; stake out alignment. Performs responsible project development work such as: field reviews projects; evaluates alternate designs requiring detailed analysis of accident data, capacity studies, hydraulics, etc. Prepares and/or reviews project definitions, project summaries, hydraulics reports, environmental documents, design estimates, right of way plans, contract plans, specifications, estimates and special provisions using field data and standard design criteria for projects such as intersections, interchanges, grading, paving, resurfacing, and drainage.

Education:

University of Washington, Seattle, WA
Mater of Science in Civil Engineering, June 1999

Oregon Institute of Technology, Klamath Falls, OR
Bachelor of Science in Civil Engineering Technology, December 1992
Associate Degree in Public Works Technology, December 1992

Accreditations:
Licensed Professional Civil Engineer, WA #37393

Thomas Markgraf
Markgraf and Associates
Public and Community Outreach Consultant
2005-present

Tom Markgraf, a community involvement consultant, has managed outreach efforts for communities and government agencies throughout Oregon since 1991. His work has included public involvement, community planning, and outreach for transit districts and government agencies. He specializes in grass roots organization and person-to-person contacts. He has also created and staffed business and community groups engaged transportation statewide issues and has designed community based transit plans, projects and funding plans throughout the region. He has managed and facilitated public planning for local and statewide transportation projects and business recruitment plans.

Professional Experience:

Markgraf and Associates, Portland, OR **1992 to present**
Barney and Worth, Portland, OR **1991 to 1992**
Transportation Outreach Consultant

Responsible for ODOT's 1991 statewide outreach which culminated in Oregon's last gas tax increase. Responsible for other transportation outreach projects including Interstate Max; City of Gresham's transportation analysis; Portland's downtown mall and I-205 business and community outreach; and, Transit Choices for Livability. Has worked on the Columbia River Crossing Project dealing with government and community outreach for 3 years.

Congressman Earl Blumenauer, Oregon 3rd Congressional District **1999 to 2006**
Senior Advisor

Advised on transportation priorities and projects. Managed Government relationships with staff and elected officials. Managed community outreach, press maters, business outreach. Labor Liaison. Served at various times as Press Secretary.

Port of Portland, Portland, OR **1988 to 1991**
Airport Terminal Properties Manager

Responsible of negotiating contracts with airlines and concessions with in the terminal. Oversaw the Oregon Market Place, which was the shopping mall within the terminal.

Central City Concern, Portland, OR **1986 to 1988**
Project Manager

Responsible for the purchase and renovation of SRO housing including the development of a homeless shelter and medical clinic in Portland's Old Town.

The Oregonian Newspaper, Portland, OR **1983 to 1984**
Bureau Clerk and cub reporter

Mt. Calvary Cemetery, Portland, OR **1978 to 1982**
Professional Grave Digger

Education:

Lyndon Baines Johnson School of Public Affairs, University of Texas at Austin
Masters of Arts in Public Affairs
May 1986

Oberlin College, Oberlin Ohio
Bachelor of Arts
June 1982

Brian McCarter, FASLA
Landscape Architect
1985-Present

Brian McCarter has more than 32 years of experience focused on urban design, landscape architecture and planning for a variety of urban, mixed-use, waterfront, campus, public open space and transportation projects. He brings an extensive background in the design of campuses, neighborhoods, parks, plazas and streets, as well as major transit and pedestrian facilities in urban settings.

Professional Experience:

Zimmer Gunsul Frasca Architects LLP, Portland, OR **05/85 to Present**
Landscape Architect for the following projects:

Street and Transit Projects
Portland Mall Revitalization: Conceptual, PE, FD, CA, Portland, OR
Portland Transit Mall Extension, Portland, OR
Interstate MAX, Portland, OR
South-North Light Rail Transitway Design, Portland, OR
Union Station Pedestrian Bridge, Station Housing and Plaza, Portland, OR
Alsea Bay Bridge, Waldport, OR
Centerline Light Rail Transit System, Orange County, CA
Embarcadero Parkway Master Plan and F Line Extension, San Francisco, CA
16th Street Transit Mall Extension, Denver, CO
Speer, 20th Viaduct Replacement, Platte River Bridge, Denver, CO
Broadway Bridge Replacement, Boulder, CO
State Street, Chicago, IL
Everett Street Station, Everett, WA
Howard Street Revitalization, Baltimore, MD

Plans for Transit Oriented Development Districts
Boise West Downtown Urban Design Development Plan, Boise, ID
Downtown Multimodal Access Plan, Denver, CO
River District Development Plan and Right-of-Way Standards, Portland, OR
Washington State University-Vancouver, Master Plan, Campus Plan, Firstenburg Plaza, Engineering and Life Sciences Building, Multimedia Classroom Building, Student Services Building, Student Services Center, Vancouver, WA
Western Gateway Master Plan, Des Moines, IA

Transit Joint Development Projects
Portland State University Transit Center, Housing Master Plan-College & Jackson Streets, Portland, OR
1201 Lloyd Boulevard Office Building, Portland, OR
12W Mixed Use Building, Portland, OR

Education:

University of Oregon, Eugene, OR
Bachelor of Landscape Architecture, 1975

Accreditations:

Registered Landscape Architect in Oregon and Washington
Fellow, American Society of Landscape Architects

Allan D. McDonald
Engineering Manager
07/2008 to present

Provide leadership and oversight to all the activities necessary to complete the highway engineering tasks required to advance the CRC project to a sufficient design level that will allow the project to proceed into PS&E.

Professional Experience:

David Evans and Associates – CRC, Vancouver, WA **04/07 to 07/08**
Senior Transportation Engineer

Develop technical memorandum on the means and methods to construct the river crossing and associated interchanges on each side of the river. Develop staging plans and construction timelines for the alternatives carried into the DEIS. Participate in CEVP, VE and other studies.

Oregon Dept of Transportation, Portland, OR **7/00 to 4/07**
Metro West Area Manager

Responsible for delivering the highway construction program in Washington County. Produced preliminary designs and contract documents through design teams and administered construction contracts through Project Managers.

Washington Dept of Transportation, Vancouver, WA **04/94 to 02/99**
Regional Project Development Engineer

Planned, directed and administered the work of senior managers engaged in multiple engineering design tasks that lead to the production of preliminary transportation designs and PS&E's.

Washington Dept of Transportation, Vancouver, WA **05/89 to 04/94**
Region Program Manager

Managed and supervised section that developed, scheduled and monitored the region's Capital Construction Program.

Washington Dept of Transportation, Vancouver, WA **11/82 to 05/89**
Project Engineer

Managed and supervised a field construction office engaged in the design and contract administration of highway transportation projects.

Education:

University of Idaho, Moscow, Idaho
B.S. (Civil Engineering) 1968

Accreditations: Professional Engineer, State of Washington, 1977 to present.

Bob Medcraft
Field Operations Manager
1994-Present

Professional Experience:

C-TRAN, Vancouver, WA **2006 to Present**
Field Operations Manager

A position within the Operations Department that directly manages all field support operations, position is responsible for the coordination and oversight of field operations to include the monitoring of system security. Investigates and responds to customer comments; investigating and resolving incidents, accidents, and personnel issues; and developing route detour information as necessary to maintain service delivery.

Develop, review, and maintain the C-TRAN System Security Emergency Preparedness Plan and conduct annual exercises to demonstrate agency emergency preparedness.

Assist supervisors in the issuance of employee discipline up to and including employment termination; monitor employee performance issues; and monitor supervisory actions with regard to employee counseling, retraining, and performance evaluations. Ensure timely investigation of accidents and incidents consistent with technical training and risk management guidelines.

Monitor customer comments and initiate corrective action to improve customer relations, operational safety, and system performance. Manage security programs to include the exclusion, appeal, and reinstatement process for patrons who violate local and state laws, codes, and ordinances.

C-TRAN, Vancouver, WA **1996 to 2006**
Field Support Supervisor (PM lead)

Directly supervise all transit service including on-street supervision of operators and contracted security officers to ensure safe operation, schedule compliance, quality customer service, and system security.

Monitor route performance and recommend changes to correct service deficiencies. Investigate and respond to customer comments. Respond to, investigate, and resolve incidents, accidents, customer comments and personnel issues.

Enforce Washington State Unlawful Bus Conduct Code (RCW 9.91.025), City of Vancouver’s Transit Center Ordinance, and C-TRAN policies to include the exclusion of patrons who violate state law and C-TRAN rules and regulations.

C-TRAN, Vancouver, WA **1994 to 1996**
Inventory Specialist

Inventory control and allocation of replacement parts for equipment utilized by C-TRAN.

Education:

Napa High School, Napa, CA
Diploma

Michael Minor
President and Senior Noise and Vibration Consultant
1989 - Present

Michael Minor is the president of Michael Minor & Associates is a noise, vibration and air quality consulting firm that specializes in performing technical analysis for all types of transportation projects, developments, industrial and commercial properties and construction activities. Michael brings a strong understanding of NEPA, USDOT, FHWA and FTA guidelines for noise and vibration analysis. Michael is the noise task manager for the Columbia River Crossing Project and the SR-520 HOV and Bridge Replacement Project in Seattle Washington. He has extensive experience working in Oregon and Washington, including several highway and roadway projects including the Ward Road Project in Clark County, the Main Street Project in Battle Ground and the Yelm Highway project just south of Olympia. We have been the task manger for noise on the SR 520 project in Seattle for over 10 years and have worked on several ODOT projects, including Highway 26 widening, Interstate 5 Preservation projects near Portland and the Fern Valley Interchange Project near Medford.

Michael performed the noise analysis and assisted in obtaining nighttime construction noise variances for the Interstate 5 Bridge Painting project, the St Johns Bridge Rehabilitation Project and the Burnside Bridge Rehabilitation Project, all located in the greater Portland Area. We also performed noise measurements of a quieter pavement test site along SR 520 near Seattle. He also performed the noise and vibration analysis for Light Rail Projects in Seattle Washington, Portland Oregon and Salt Lake City Utah.

Recent high capacity project EA and EIS Michael worked on include the Portland to Milwaukie and Interstate Light Rail Projects in Portland, the Tacoma Light Rail Project and several commuter rail projects in the Seattle - Tacoma area. Each of these projects required a detailed level of noise and vibration analysis, including the measurement of existing project area noise levels, existing ground borne vibration levels and vibration propagation characteristics. Other high capacity transportation projects include the expansion of the Lane Transit District Operational and Maintenance Facility, the Lane Transit District Rapid Bus Corridor Project, and a new transit center, all located in the greater Eugene – Springfield area.

Professional Experience:

Eastside Link Light Rail Technical Noise and Vibration Studies, Seattle-Bellevue-Redmond:
Completion Date: Project is on-going
Budget: $180,000 (approximate)

SR 520 Bridge Replacement and HOV Project, Seattle to Redmond:
Completion Date: Project is on-going
Budget: $400,000 (approximate)

I-205 Preservation and Auxiliary Lane Project, Portland Oregon
Completion Date: April, 2006
Budget: $23,000

Education:

Whitman College, Walla Walla, WA
B. A. Physics; B.A. Mathematics

Accreditations:
Member Acoustical Society of America
Member Institute of Noise Control Engineering

Timothy M. Moore, P.E., S.E.
WSDOT Mega Projects Bridge Manager
1983-present

- 2 years of experience as Construction Inspector for the SR 104 Hood Canal Floating Bridge Drawspan Unit Project
- 22 years of experience as a structural designer with the Bridge & Structures Office including 14 years as project coordinator for numerous bridge design projects. 21 years of experience as a Bridge Technical Advisor providing technical assistance to bridge construction Project Engineers.
- 1 year as the Bridge Office Mega Projects Bridge Manager providing bridge related support services to the I-5 Vancouver to Portland Columbia River Crossing, Alaska Way Viaduct, I-90 Snoqualmie Pass Snow Shed and the I-5 Puyallup River Bridge Projects.

Professional Experience:

Mega Projects Bridge Manager — 2007 to present

Leading structural design and P,S&E preparation for the SR 99 Alaskan Way Viaduct South Interchange mainline bridge. Provided long-span bridge engineering support to the SR 520 West Approach and Central Waterfront Alaskan Way Viaduct Project. Bridge alternatives study includes pre-cast segmental by balanced cantilever and overhead gantry, cable-stayed and suspension bridges with associated foundation types and cost estimates.

Public Partner Representative — 1996 to 2007

Public partner representative for WSDOT Bridge Office in the Public-Private Partnership Design-Build Project for the New Parallel Tacoma Narrows Suspension Bridge and Seismic Retrofit of the Existing Suspension Bridge. Primary structural engineering representative for the successful completion of the Major Investment Study, TS&L, Environmental Impact Statement, Basic Configuration, Initial Design and the Negotiated Fixed Price Design-Build Contract. Primary structural engineering design reviewer for the bridge design and continuing in construction drawing and change review. Relocated full-time to the Tacoma Narrows Bridge site office from 2003 to the 2007 bridge opening.

Principal Designer — 2000 to 2002

Principal designer of 8-span highly curved multiple steel box girder for the SR 519 Intermodal Access Project in Downtown Seattle.

Project coordinator & Principal designer — 1992 to 1996

Project coordinator & Principal designer of the 375 ft main span SR 509 Foss Waterway Cable-Stayed Bridge, Tacoma City Center. Responsible for tower design, stay cable design and geometry, shop drawing review, bridge technical advisor services, fatigue test set-up inspection, fabrication & assembly procedures, cable stressing, cable adjustment analysis and final corrosion protection system installation methods.

Superstructure designer — 1994

Superstructure designer of the 445 ft main span SR 509 Puyallup River C-I-P Segmental Bridge

Superstructure designer — 1988

Substructure designer of the 550 ft main span SR 504 Hoffstadt Creek C-I-P Segmental Bridge Alternative.

Education:

University of Washington, Seattle, WA
BSCE, 1982

Accreditations:

Washington State: Licensed Civil (1987) and Structural Engineer (1991)

Stephen T. Morrow
Environmental Coordinator
3/2009-present

Steve coordinates the work of the Consultant Environment Team with regulatory agencies and works closely with the regulatory agencies to insure ODOT and WSDOT compliance with the National Environmental Policy Act, Endangered Species Act, Clean Water Act and the environmental laws of the states of Oregon and Washington and the cities of Portland and Vancouver .

Professional Experience:

Henderson Land Services, Lake Oswego, OR **5/2005 to 9/2008**
Natural Resource Manager

Senior consultant of Henderson Land Services (HLS) natural resources section; responsible for project management of all HLS natural resource projects including: natural resource assessments, environmental restoration design and environmental regulatory permitting, oversight of construction drawings and specifications preparation for stream and wetland restoration projects, construction management and post-project implementation monitoring of stream and wetland restoration projects. Additionally was responsible for oversight of project budgets and maintaining client relations for projects in western Oregon and southwestern Washington, and provided internal training and guidance to HLS employees to be able to perform regulatory environmental permitting and assessments.

Oregon Department of State Lands, Salem, OR **9/1997 to 5/2005**
Natural Resource Coordinator

Reviewed and issued regulatory removal-fill permits throughout western Oregon. Team leader for enforcement of the Oregon Removal-Fill Law, administered most of the enforcement cases that DSL prosecuted in criminal or civil arraignments in conjunction with the Oregon Attorney General’s office. Represented the Agency on the Oregon Plan for Salmon and Watersheds Monitoring and Implementation Team. and negotiations with the National Marine Fisheries Service, US Fish & Wildlife Service, Corps of Engineers and Oregon Department of Fish & Wildlife during consultation under Section 7 of the Endangered Species Act and the application and process of the State Programmatic General Permit (SPGP) and Section 404 Clean Water Act assumption from the Corps of Engineers.

Clackamas County WES, Oregon City, OR **10/1994 to 8/1997**
Surface Water Technician

Staff biologist for issues relating to streams and wetlands in the North Clackamas Urban Area. Implemented a new surface water management program that was established to address surface water quality and quantity issues, as well as aquatic habitat evaluation and protection. Conducted project management and contract administration on capital improvement projects.

Biological Services, Chamberlain, SD **4/1994 to 10/1994**
Wildlife Biologist

Oregon Department of Fish & Wildlife, Clackamas, OR **4/1991 to 4/1994**
Experimental Biological Aide

Education:

South Dakota State University, Brookings, SD
B.S. Wildlife & Fisheries Sciences, 1989

Charlene K. Mullis
Property Acquisition Specialist III, Title Examiner
2006-present

Investigated and researched property ownership, Liaison with title companies to secure title commitments and policies, Examined and validated right-of-way design and plans, Examined, validated and formulated legal descriptions of property owned by the state and to be acquired, Negotiated with property owners to secure any lands or interests in land for right-of-way for any state highway and facility, under the imminent threat of the states rights of Eminent Domain , Acquired necessary right-of-way in accordance with regulatory requirements, and industry prerequisite, Examined, validated and formulated legal documents, i.e. deeds, easements, agreements, right-of-entry permits, Reviewed and monitored the preparation and processing of all acquisition files, i.e. title clearance, legal documents, and approved right-of-way plans.

Professional Experience:

First American Title, Vancouver, WA **01/1997 to 08/2006**
Limited Practice Officer/Escrow Closer for National Accounts
Commercial Real Estate Escrow Assistant

Reviewed, interpreted, and clarified buyer, seller, and lender instructions, Assembled, organized, prepared, and reviewed approved legal documents in accordance to the terms of the real estate transaction, Deposit and maintain funds held in escrow accounts, Calculated, allocated and disbursed funds in accordance to terms of R.E.S.P.A. and Department of Finance, Prepared and distributed final closing statements, Handled real estate owned, foreclosure and relocation transactions.

Crown Federal Credit Union, Wilsonville, OR **06/1995 to 01/1997**
Assistant Vice President of Mortgage Lending

Assembled, organized, prepared and reviewed loan documents in accordance to the terms of the real estate transaction, Calculated, allocated and disbursed loans in accordance to terms of R.E.S.P.A. and investor requirements, Computed, deposited and serviced mortgage payments for loans sold on the secondary market, and Provided financial counseling to customers.

Portland Teachers Credit Union, Portland, OR **01/1989 to 06/1995**
Real Estate Servicing Supervisor, May 1994 June 1995
Assistant Director of the Real Estate Department, April 1993 May 1994
Real Estate Loan Officer, January 1990- April 1993
Real Estate Loan Processor, January 1989 January 1990

Assembled, organized, prepared and reviewed loan documents in accordance to the terms of the real estate transaction, Calculated, allocated and disbursed loans in accordance to terms of R.E.S.P.A. and investor requirements, Computed, deposited and serviced mortgage payments for loans sold on the secondary market, Provided financial counseling to customers, Evaluated performance, trained and supervised work of employees, and Developed and implemented team leadership training.

Education:

Eastern Oregon University, La Grande, OR – Graduated June 2009 G.P.A. 3.746
Bachelor of Science in Business Administration with a concentration in Leadership/Management

Accreditations:
Limited Practice Officer (L.P.O.); Admitted by the State of Washington Supreme Court, 2003
Notary Public of the State of Washington

Kenneth Murto, PLS
Project Surveyor
2006-present

Mr. Murto is a professional land surveyor with more than 33 years of experience in right-of-way and boundary resolution; topographic surveying; preparation of plats and legal descriptions; construction management, calculations and staking; establishing horizontal and vertical control networks using terrestrial and GPS measurement methods. For the past eight years he has specialized in managing GPS survey projects. He has experience in the design and management of static/fast-static control surveys; in using RTK GPS methods for staking on boundary and topographic surveys; and in analyzing and adjusting GPS data using Trimble Geomatics Office (TGO) software along with Leica Geomatics Office (LGO). He is also skilled in the adjustment of control networks using Star*Net Plus least squares adjustment software where GPS and terrestrial measurements are combined.

Professional Experience:

Crane & Merseth Engineering/Surveying, Milwaukie, Oregon **7/05 to 7/06**
Survey Manager

Mr. Murto managed the survey department of a small engineering and land surveying company. Projects included control networks and topographic route mapping for sanitary sewer, water and transportation projects; records of survey showing resolved boundaries and property line adjustments; partition plats and aerial mapping control.

David Evans and Associates, Portland, Oregon **2/96 to 7/05**
Project Surveyor

Mr. Murto was project surveyor and survey task lead while working on a wide variety of projects for clients that included the Federal Highway Administration, the US Army Corps of Engineers, the Oregon Department of Transportation, Washington County, Marion County, TriMet and the Port of Portland.

David Evans and Associates, Portland, Oregon **2/90 to 2/09**
Survey Party Chief/Senior Party Chief

Mr. Murto worked as the party chief on survey field crews. As such he directed the daily activities of two and three-person crews working on a wide variety of projects including those requiring horizontal and vertical control measurements, boundary surveys, topographic mapping and construction layout. While working on the survey of the east entrance road at Yellowstone Park for the Federal Highway Administration he directed the daily activities of three survey crews and processed/checked daily collection files on this 7-mile project.

Education:

University of Oregon, Eugene, Oregon
B.S. Anthropology

Aaron M. Myton, P.E., L.S.I.T.
Lead Roadway Engineer
February 2009-present

Aaron oversees the design and preparation of the roadway portions of plans and estimates for the Columbia River Crossing project with a focus on the proposed improvements in Oregon. Responsible for ensuring proper documentation and adherence to standards. Develops and revises Interchange Designs that relate to Standard Interchange configurations and access management rules. Frequent coordination with the Environmental, Bridge, Transit, Traffic, and Communications Teams as well as ODOT, WSDOT, FHWA, City of Portland, Metro, Tri-Met, and other stakeholders.

Professional Experience:

Oregon Department of Transportation, Portland, OR **8/08 to 2/09**
Lead Senior Roadway Designer (Principal Engineer)

Lead the development of project alternatives, final roadway plans, specifications and estimates for construction contracts. Team lead for 5 roadway engineering staff and specification writers. Scoping projects to establish scope, schedule, and budget for those projects. Coordinated with local, state, and federal agencies and stakeholders for roadway portion of the projects.

Oregon Department of Transportation, Portland, OR **9/99 to 8/08**
Senior Roadway Designer (2 years) and Design Team Leader

Led the development of project alternatives, roadway plans, specifications and estimates for construction contracts. Worked on and led scoping projects to establish scope, schedule, and budget for those projects. Work included horizontal and vertical alignments, project alternatives, interchange layout, roadside design, roadway cross sectional elements, and pedestrian/bike improvements. Coordinated with local, state and federal agencies and stakeholders for roadway portion of projects.

Oregon Department of Transportation, Beaverton and Portland, OR **11/97 to 9/99**
Assistant Survey Crew Chief/Roadway Designer/Construction Inspector

Led field survey crew in establishment of horizontal and vertical control, boundary survey, topographic mapping, drainage studies, observation of slide monitors, instrument calibration, and office processing of collected field survey data. Designed roadway projects. Worked on and led scoping teams and prepared scoping documents for the programming of projects. Served as a construction inspector for highway projects that included; grading, paving, drainage, waterlines, bridge demolition, slide repair, and fish passage culverts. Interacted daily with contractors and sub-contractors toward the successful completion of construction projects

Tacoma Public Utilities, Tacoma, WA **3/97 to 11/97, 6/96 to 9/96, and 6/95 to 9/95**
Engineering Trainee

Survey technician for control traverse surveys, dam safety instrumentation readings, operating GPS receivers, processing raw survey data, research of survey records, topographic mapping, and construction staking.

Education:

Portland State University, Portland, OR
Masters of Science in Civil and Environmental Engineering, June 2004

University of Washington, Seattle, WA
Bachelor of Science in Civil Engineering, December 1996

Pierce College, Tacoma, WA
Associates of Arts and Science, June 1994

Accreditations:
Registered Professional Civil Engineer: Oregon No. 58614PE
Land Surveying Intern: Oregon No. 1668LSIT

Michael R. Nichols, P.L.S.
Survey Manager
9/2008 - Present

Michael manages all survey work for the Columbia River Crossing project, including consultant and D.O.T. staff. He provides expert advice to the project's Management Team on survey related issues and expenditures and is responsible for the management of all survey field activities.

Professional Experience:

W.S.D.O.T., Vancouver, WA **4/08 to 9/08**
Cadastral Survey Manager, TE-4

Management of regional D.O.T. Cadastral Survey Team. Provides expert survey advice to regional D.O.T. management regarding issues like regional survey staffing and structuring needs. Acting regional survey lead and D.O.T. State Survey Committee representative.

W.S.D.O.T., Vancouver, WA **2/06 to 4/08**
Survey Team Leader, TE-3

Management of a Field Survey Team for a regional D.O.T. Construction office. Managed survey operations of the construction of the I-5 / I-205 interchange project.

W.S.D.O.T., Vancouver, WA **6/05 to 2/06**
Cadastral Surveyor, TE-3

Management of regional D.O.T. surveying and right of way records. Provide assistance to agency and public inquiry of records. Provided professional advice and assistance to regional D.O.T. Construction offices with survey related work. Responsible for the completion of Records of Survey and other required survey documents when necessary.

MacKay & Sposito Inc., Vancouver, WA **7/95 to 6/05**
Land Surveyor

Provide assistance to Survey Management with projects including research, boundary calculations, and the drafting of records of surveys. Directly manage field survey data by uploading – downloading data collectors and the processing of survey control.

Education:

Washougal High School graduate 1984 - Washougal, WA

Accreditations:

Chapter President of the Land Surveyor's Association of Washington (L.S.A.W.) 2009.
Professional Licensed Land Surveyor (P.L.S.) in the State of Washington - 2004.
Fundamentals of Land Surveying (F.L.S. aka L.S.I.T.) - 1997.
First Responder Certificate (EMS) - 1994.
Honorably discharged from US Navy (Petty Officer 3rd Class), Good Conduct medal - 1989.
Naval Expeditionary medal - 1988.

Gerald V. Nielsten, P.E., PP
Senior Principal
1976 – Present

Mr. Nielsten is the principal-in-charge of the majority of the firm's transportation, economic feasibility studies. He is accomplished in the analysis of toll facility revenue programs, the preparation of traffic projections for site development and roadway projects, the assessment of transportation requirements, and the preparation of transportation master plans.

Professional Experience:

Transurban, Washington D.C. **2004 - 2008**
Capital Beltway HOT Lane Project, Principal-in-charge

Responsible for conducting investment grade traffic and revenue study for $1.7 billion, 14 mile HOT Lane in northern Virginia.

Orlando-Orange County Expressway Authority, Orlando, Florida **1979 - ongoing**
Traffic & Revenue Studies, Principal-in-Charge

Responsible for projecting future revenues on the existing highway network through the use of traffic model data. Revenues were also projected for a feasibility study of the Western Beltway. Responsible for evaluating current market penetration and developing incentives to increase off-peak market penetration for the OOCEA System.

New York State Thruway, Albany, New York **1979 - ongoing**
Traffic & Revenue Studies, Principal-in-Charge

Principal-in-charge for various projects including traffic and revenue forecasts, the interim signage system for the Thruway's Spring Valley toll plaza, reviewing the safety of electronic toll collection, designing a conceptual toll plaza of the future and developing a classification system compatible with AVC (automatic vehicle classification) and ETC (electronic toll collection).

Orange County Transportation Authority, Orange County, California **2002 - ongoing**
SR 91 Express Lanes Traffic and Revenue Study, Principal-in-Charge

Principal-in-charge of projecting traffic and revenue estimates for various congestion pricing toll alternatives on the 91 Express Lanes. Tasks included developing toll diversion curves and a micro-simulation model to estimate toll road use. Revenue forecasts were used as the basis for the first Aureted new toll road financing. Also worked closely with OCTA to develop a demand based toll policy.

Transportation Corridor Agencies, Orange County, California **2002 - ongoing**
Traffic & Revenue Studies, Principal-in-Charge

Principal-in-charge of the traffic and revenue study being conducted for the San Joaquin Hills (SJH) and the Foothill / Eastern (F/E) Transportation Corridor Agencies (TCA). These joints-powers agencies operate two toll road facilities in Orange County, built in stages between 1993 and 1999 with a total length of 51 miles, processing some 250,000 average daily toll transactions.

Texas Department of Transportation, Austin, Texas **1999 - ongoing**
Central Texas Turnpike Project, Principal-in-Charge

Responsible for conducting an investment grade level traffic and revenue study of proposed 70-miles of turnpike serving the rapidly growing suburbs of Austin, Texas. Report became basis for the largest sale of bonds for a new toll road in US history.

Education:

Dartmouth College, Hanover, New Hampshire
B.S. Transportation Design, Planning, and Policy, 1972
B.A. Engineering Science, 1971

Accreditations:
Professional Engineer in New York and New Jersey

Kent Norville, Ph.D.
Atmospheric Scientist

Dr. Norville is an Associate Atmospheric Scientist and project manager at Air Sciences Inc. in Portland Oregon. He is a specialist in air quality dispersion modeling, data analysis and model development. He has considerable experience with a wide variety of models for a number of different public and private sector modeling applications. Applications include regulatory permit modeling, risk assessments, and environmental impact statements; deposition studies; accidental release dispersion modeling; visibility modeling; water vapor cloud assessments; odor assessments; transportation conformity and hot spots dispersion modeling; meteorological data processing and assessments; specialized modeling; and custom model development.

Professional Experience:

Air Sciences Inc, Portland, OR **7/99 to Present**
Atmospheric Scientist and Associate Project Manager

Job Description: Managed and conducted air quality modeling and data analysis jobs for government and private sector clients. Set-up and ran emissions, air quality dispersion, transportation hot spots, long range transport, and other air quality related models.

CH2M Hill, Portland, OR **1/95 to 6/99**
Atmospheric Scientist

Job Description: Managed and conducted air quality modeling and data analysis jobs for government and private sector clients. Set-up and ran emissions, air quality dispersion, transportation hot spots, long range transport, and other air quality related models.

University of Washington, Seattle, WA **1/92 to 12/95**
Research Scientist

Job Description: Project manager for building and launching high altitude, long duration super pressure balloon payloads designed to measure atmospheric electrodynamic parameters in the stratosphere. Launches occurred in the southern hemisphere and in the eastern seaboard. Developed a thunderstorm electrification model used to study the time buildup and discharge process in thunderstorms.

Education:

University of Washington, Seattle, WA
Ph.D. Geophysics

California Polytechnic State University, San Luis Obispo, San Luis Obispo, CA
B.S. Physics

Christine Novotny
Community Relations Manager
2006 – Present

Ms Novotny is currently the Community Relations Manager for the Washington County Commuter Rail construction project. This new line, a 14.7-mile project linking the Cities of Wilsonville, Tualatin, Tigard & Beaverton, is Oregon's first commuter rail line & one of the few suburb-to-suburb lines in the nation. In her role as Community Relations Manager, Chris capitalizes upon her 21 years of risk management experience to build & maintain open, proactive relationships with the contractors, jurisdictional partners & general public.

Professional Experience:

TriCounty Metropolitan Transit Agency, Portland, Oregon **2006-present**
Community Relations Manager

From project concept through construction, provide management & planning expertise in the development & implementation of comprehensive community outreach & customer service programs for capital rail & bus service improvements. Develop proactive strategies for informing & educating transit customers, neighbors, property owners, jurisdictions, & businesses to help mitigate the impact of bus service & rail construction projects. Research & respond to highly charged & controversial community issues. Manage project outreach staff. Assist with development of project-related media strategies & communications; serving as the project spokesperson as requested. Develop & manage tailored safety outreach programs for new service. Identify safety issues, develop safety strategies & programs, conducts safety presentations, workshops, training to communities, residents, schools, shopping centers, high bus transfer location customers, medical facilities & businesses located along light rail & commuter rail alignments.

Oregon Health & Science University, Portland, Oregon **2004-2006**
Risk & Insurance Administrator

Manage $13M risk financing program comprised of combinations of insurance, self-insurance & captive insurance vehicles to minimize impacts of loss on the $1.18B annual operational budget & the professional liability exposures of its 11,500 employees. Responsible for implementation & management of the risk financing program including developing risk financing strategy & executing against that strategic direction. Develop, implement & deliver educational & informational resources for the OHSU community relating to insurance, best business practices, general liability, property loss, employee safety & risk financing. Act as a risk liaison to hospital & university departments. Manage general liability, auto liability & property claims.

Tri-County Metropolitan Transit Agency, Portland, OR **2000-2004**
OCIP Risk Manager

Manage agency's commercial insurance portfolio. Responsibilities include risk mapping, insurance marketing, negotiating policies, & on-going administration. Manage carrier / broker relationships. Design, market & implement the owner-controlled insurance program (OCIP) for light rail project, saving project over $1.45M in insurance costs. Responsible for claims management (all-lines) & litigation support; loss control; and community relations coordination.

Port of Portland; City of Portland, Portland Oregon **1985-2000**
Senior Risk Analyst

Develop & implement risk management & loss control programs. Assess special events risk, including air shows & multi-week celebration of the arts. Supervise staff. Conduct cost benefit analysis to determine retention levels & evaluate alternative financing programs. Manage environmental claims portfolio for Superfund sites. Design & implement Risk Management Information System Design, market & manage the owner-controlled insurance program (OCIP) for airport expansion projects.

Education:

Oregon State University B.S. Health & Safety, 1981

Accreditations:
Associate in Risk Management (A.R.M.); Governmental Risk Management Certificate

Gavin J. Oien, P.E.
Consultant Highway Engineering Task Lead
2005 – Present

Gavin provides supervision to the consultant highway design team. He is responsible for directing and reviewing the highway design developed by the consultant team. He provides input on the development of the highway design work plans, resource allocation, and coordination with the other discipline teams. He also provides support for technical presentations to key project stakeholders.

Professional Experience:

Gavin has 15 years of experience in transportation and general civil engineering. During the past three years, he has focused on leading the design team for the Columbia River Crossing project in support of the EIS. This work required close coordination and collaboration with a number of sub-consultant professionals and multiple authorizing agencies. Prior to that, Gavin was involved in the planning, design, management and construction of several large Washington County, Oregon transportation projects. His experience with large transportation projects has given Mr. Oien a unique and in-depth understanding enabling him to direct and coordinate the efforts of planning, permitting, alternative analysis, interdisciplinary design, and development of final plans, specifications and estimates. As a designer, Mr. Oien has developed his skills to be knowledgeable in roadway design and modeling, grading design and modeling, stormwater quantity and quality design, and utility layout and design among other things.

David Evans and Associates, Inc., Portland, Oregon **1998 to present**
Associate, Senior Civil Engineer

Washington County Projects:
Brookwood/Witch Hazel Intersection Improvements, Walnut Street Road Improvements, Baseline Road Improvements, Oregon Street Road Improvements, 170th Avenue Road Improvements

Cowlitz County Projects:
Nevada Drive Bridge Replacement, Waters/Sandwood Stormwater Improvements

TriMet Projects:
Airport MAX Extension

James Engineering, Vancouver, Washington **1994 to 1998**
Designer, Engineer in Training

Education:

University of Washington, Seattle, Washington
B.S. Civil Engineering, 1994

Accreditations:
Professional Engineer in Washington, Oregon, and California

Meghan Oldfield, P.E.
Design and Construction Manager

Meghan will perform overall management of the transit related design and construction contracts for the Columbia River Crossing project. She will oversee project staff that manage individual contracts and will report directly to the transit Project Director.

Professional Experience:

TriMet, Portland, Oregon **2003-Present**
I-205 Light Rail Resident Engineer

Performed and managed conceptual and preliminary design for 6.5-mile light rail extension along I-205 freeway. Managed $163 million final design and construction contract for same project. Duties included working with project stakeholders, identifying and adhering to permit requirements, verifying and processing monthly progress payments, quality assurance, safety oversight, change order negotiation, public presentations, consultant and contractor oversight and management, project staff management, encouraging sustainable design and construction practices, and assisting Real Property and Community Relations staff.

TriMet, Portland, Oregon **2001-2003**
Interstate MAX Light Rail Field Engineer

Performed field engineer duties for construction of $350 million, 5.5-mile Interstate MAX light rail. Duties included civil, bridge and trackway construction inspection, progress payment verification, project management assistance, safety certification compilation, consultant oversight and management, and cost estimate preparation. Also responsible for communicating with partner agencies, consultants, and contractors for project coordination, monitoring contractor QA/QC program and providing on-site engineering solutions for construction conflicts.

Tetra Tech/KCM Consulting Engineers, Portland, Oregon **1999-2001**
Project Engineer

Assisted Project Managers in the following tasks:

- Technical Specification Preparation and Wastewater Facility Master Plan Preparation
- Watershed Hydrologic and Hydraulic Modeling
- Roadway Design and ODOT Maintenance Facility Design
- Phase I Environmental Site Assessments
- Prepared Master Plan and Preliminary Engineering Report for Industrial Development

Completed work on multiple ongoing projects. Responsible for communicating with clients, design subcontractors, and contractors for project coordination. Performed construction submittal review. Presented technical material at public meetings.

Gove Associates Consulting Engineers, Kalamazoo, Michigan **1997-1998**
Project Engineer

Assisted Project Managers in the following tasks:

- Storm Sewer Design and Construction Inspection
- Wastewater Treatment Plant and Sanitary Sewer Design
- WWTP Operation and Maintenance Manual Preparation
- Roadway Design and Construction Inspection

Education:

University of Maine
M.S. Civil & Environmental Engineering, 1996

Michigan Technological University
B.S. Environmental Engineering, 1994

Accreditations:
Professional Engineer in Oregon

Ryan Orth
Communications Team
2006 – Present

Ryan develops and presents public information materials for the Columbia River Crossing project. He writes and edits fact sheets, display boards, presentations, website text, and speaking points using technical documents and interviews with engineers, planners and project managers. He provides support to internal and collaborative project working groups and educates members of public at outreach events.

Professional Experience:

Ryan Orth has over 7 years experience as a consultant supporting a variety of planning, policy development, management consulting, and public involvement projects through facilitation, research and analysis, and communications and outreach support. He supports the creation of communication and outreach plans and prepares materials to support all aspects of outreach.

Lewis County Public Works, Lewis County, WA **04/08 to 03/10**
South Lewis County Subarea Transportation Plan

Supported Lewis County's long-range corridor and interchange improvement plan for State Route 505 and the South Lewis County subarea. Facilitated planning team meetings; developed a communications and outreach strategy; staffed informational outreach events; and developed meeting materials, including project folios and fact sheets, a traveling informational display, meeting publicity (mailers, e-mail announcements, posters, flyers) and a project website.

Oregon Department of Transportation, Salem, OR **08/08 to 01/10**
Strategic Tolling Communications Plan

Supported Oregon Department of Transportation as they conducted detailed analyses to lay the policy groundwork for a comprehensive, state-wide consideration of tolling and pricing issues. Assisted with the identification of statewide tolling and pricing stakeholders; support for development of the strategic communications plan; assistance in developing briefings for ODOT, the Transportation Commission, and the Tolling Steering Committee; and contributions to outreach materials.

Oregon Department of Transportation, Region 2 **09/08 to 11/09**
I-5: Santiam to OR-34 Cultural and Natural Resources Database

Provided database development and research support for ODOT as they plan for a number of improvements to Interstate 5 between the Santiam River and OR-34. Designed and developed database architecture, conducted research and analysis relative to areas of potential natural, cultural, and historic resource impact, identified potential stakeholders for future outreach efforts.

City of Portland, Parks & Recreation/Portland Development Commission **2007**
Waterfront Park & Ankeny Plaza Street Improvements

Supported Portland Development Commission and Portland Parks and Recreation as they held discussions over design improvements for the area around the Ankeny Pump Station in Waterfront Park and for Ankeny Plaza, Ankeny Street, First Avenue, and the area under the Burnside Bridge. Supported the facilitation for the project advisory committee process, recorded meeting proceedings, and developed comprehensive meeting summaries.

Education:

Huxley College of the Environment, Western Washington University
Bachelor of Arts, Planning & Environmental Policy, 2001

David Parisi, PE
Columbia River Crossing Project Traffic Manager
2005-present

David Parisi leads the Columbia River Crossing project's transportation planning and traffic engineering program. He manages a team of transportation engineers from both the public and private sectors. His team is responsible for developing travel demand forecasts, preparing traffic operations assessments, and evaluating impacts and identifying solutions for automobile, truck, bicycle, and pedestrian mobility.

Professional Experience:

Parisi Associates, San Francisco, CA and Portland, OR **1997 - 2008**
Principal

Responsible for day-to-day management of Parisi Associates Transportation Consulting and management of various multi-modal projects. Provided management of transportation planning and traffic engineering tasks for the Columbia River Crossing Project (Portland, OR and Vancouver, WA), the Third Street Light Rail Project (San Francisco, CA), the Airport MAX Light Rail Project (Portland, OR), the Market Street Project (San Francisco, CA), and the I-5 Corridor Plan (Oregon).

CH2M HILL, Portland, OR **1993 - 1997**
Senior Transportation Engineer

Responsible for management of various multi-modal projects, including the TSM element of the South-North Light Rail Project (Portland, OR), the Willamette River Bridges Multi-modal Accessibility Project (Portland, OR), and the OR 99W Corridor Plan (Oregon).

DKS Associates, Oakland, CA **1988 - 1993**
Transportation Engineer

Responsible for management of highway corridor plans, highway designs, and traffic signal system projects, including the SR 242 Corridor Plan and PS&E (Concord, CA), the SR 4/Bailey Road-BART Station Project (Pittsburg, CA), and design of over 100 traffic signal systems (throughout CA).

Turner, Collie & Braden, Denver, CO **1986 - 1988**
Civil/Transportation Engineer

Responsible for supporting the design of highway and other infrastructure projects, including the I-25/I-70 interchange (Denver, CO) and the Arapahoe County Arterial Roadway Program (Arapahoe County, CO).

Education:

Colorado State University, Fort Collins, Colorado
Bachelor of Science in Civil Engineering, 1985

Accreditations:
Professional Civil Engineer in Washington, Oregon, and California
Professional Traffic Engineer in Washington and Oregon

Risheng "Park" Piao, PE
Geotechnical Engineer | Senior Associate
2005-present

Park has over 20 years of geotechnical engineering experience including 9 years in the Northwest. He has a strong background in leading complex projects which involve analyzing and designing pile, pier, and drilled shaft foundations, especially laterally loaded piles and piers including power transmission line monopole "short and fat" piers. He is also experienced in seismic ground motion characterization analysis, liquefaction analyses, post-liquefaction settlement analyses, post-liquefaction soil residual strength evaluations, and seismic soil-structure design. Park's other areas of expertise include retaining wall and shoring design, landslide remediation, soil improvement, shallow foundation design and settlement analysis, and construction consultation, particularly for pile and pier installations, soil nailing, and tiebacks.

Professional Experience:

Shannon & Wilson, Inc., Lake Oswego, Oregon **5/05 to present**
Geotechnical Engineer

Market sector leader for transportation. Projects include work on roadways, highways, bridges, rail-transit, tunnels and elevated structures. Park played a key role in the geotechnical design and construction management of numerous CSO projects for the City of Portland Bureau of Environmental Services, the Westside Light Rail Project, Hillsboro Extension, and Interstate MAX Light Rail Project for TriMet. Park completed numerous bridge replacements and pavement design studies for local agencies in Oregon administered by the Oregon Department of Transportation, as well as numerous Washington DOT projects.

Kleinfelder, Inc., Portland, Oregon **11/03 to 5/05**
Geotechnical Engineer

Squier Associates, Portland, Oregon **6/96 to 11/03**
Geotechnical Engineer

Yanbian University Civil Engineering Design Institute, Yanji, China **7/86 to 8/93**
Civil Engineer

Education:

Portland State University
MS, Civil Engineering, 1996

Dalian Institute of Technology
BS, Civil Engineering, 1986

Accreditations:
Registered Civil Engineer, Oregon, 58419PE, 1999

Scott Patterson, C-TRAN
Director of Development & Public Affairs
2003-present

Manages C-TRAN's development and public affairs programs, including short/long range planning, capital projects, government affairs, media relations, marketing and community involvement. Serves on C-TRAN's Executive Staff, which includes four department directors and the Executive Director/CEO, and is responsible for making agency-wide decisions on a variety of issues. Current departmental projects include the Columbia River Crossing Project, C-TRAN's 20-Year Transit Development Plan, Clark County's High Capacity Transit Study and the development of the agency's Vanpool program. Serves as the agency's lead resource in communicating with print and television media, elected officials and government agencies. Manages C-TRAN's contracted lobbyist, its annual legislative agenda, and testifies on the agency's behalf. Coordinates the agency's legislative priorities and meets regularly with local/regional governmental agencies to advance C-TRAN's positions, needs and priorities. Also manages the agency's marketing and community involvement programs, which includes giving frequent presentations to numerous community groups and neighborhood associations.

Professional Experience:

Greater Vancouver Chamber of Commerce **2000-2003**
Acting President & Director of Public Affairs
Director of Public Affairs

Managed the Chamber's public affairs program which included government, community and media relations. The local government advocacy program focused extensively on the county's Growth Management Comprehensive Plan Update, transportation funding/policy and business tax and fee proposals. Responsible for producing the annual legislative agenda in partnership with two other local economic development organizations, preparing and delivering testimony to local governments and the state legislature, and managing communications to the media and Chamber membership.

Clark Co. Home Builders and Association of Realtors **1999-2000**
Director of Government/Public Affairs

Primary responsibilities included advocating for legislation important to the industry while developing effective relationships with local and state elected officials, with the primary emphasis on the update of Clark County's Growth Management Act. This included regularly preparing and delivering testimony to elected officials and writing articles/press releases for the media and the organization's membership.

United States House of Representatives **1995-1999**
Senior Field Representative

Responsible for implementing and managing former U.S. Congresswoman Linda Smith's regional field work throughout the 3rd Congressional District in Southwest Washington. Primary focus included working with local governments and agencies on federal legislation and issues related to transportation, public safety, environmental policy and emergency management.

United States Senate **1993-1995**
Senior Staff Assistant

Served as a liaison on behalf of former United States Senator Slade Gorton between constituents and federal agencies including the U.S. Army Corps of Engineers, the Department of Energy and the Department of Education.

Education:

1993	**Bachelor's Degree, Washington State University**
1991	**Associate's Degree, Clark College**

Professional/Community Involvement:

2006	**Executive Management Program, University of Washington**
2003	**Leadership Clark County**
2002 – 2003	**Board Member, SW WA Chapter, American Red Cross**
2002	**Vancouver Business Journal Top 40 Under 40**
2001	**General George C. Marshall Public Service Leadership Award**

William J. Perkins, LEG
Senior Associate
1990-present

Bill Perkins is a principal Engineering Geologist with nearly 20 years of experience at Shannon & Wilson. While he has worked extensively on earthquake engineering projects (*over 100 in North, South, and Central America*), he also has experience in numerous projects requiring geologic and geotechnical expertise. These projects have ranged from relatively simple site reconnaissance for siting and construction of simple structures to complex studies for design of high-rise buildings, major highway bridges and tunnels, nuclear containment facilities, regional earthquake hazard mapping studies, and site-specific earthquake engineering studies for retrofit of existing structures and design of new facilities. His experience includes planning and executing site explorations (*reconnaissance, mapping, test pits, drilling, geophysical testing*) field and laboratory testing, engineering analysis and design (*earthquake, slope stability, ground improvement, retaining walls, foundations, piling, drainage*), report preparation, review of plans and specifications, and construction monitoring.

Professional Experience:

Shannon & Wilson, Inc, Seattle, Washington **5/90 to present**
Senior Associate | Engineering Geologist

Bill has over 20 years of experience at Shannon & Wilson and leads our firm's earthquake engineering services group. He manages traditional geotechnical/geologic engineering projects and seismic design and retrofit projects/tasks. Bill's management and technical experience includes probabilistic seismic hazard analysis (PSHAs), bridge seismic evaluation/retrofit projects, IDIQ seismic evaluation contracts for the GSA, seismic tasks on major structures, transportation and infrastructure projects (*Qwest Field/Seahawks Stadium, Alaskan Way Viaduct, New Tacoma Narrows Bridge, Brightwater Treatment Plant*). With a solid technical background in both geology and soil mechanics, he is uniquely qualified in assessing the complete spectrum of geotechnical earthquake engineering, from tectonics and seismicity to site response and engineering solutions. His experience encompasses tectonic, seismicity, and fault characterization for assessing earthquake risks and developing design criteria on both site-specific and regional scales. His experience includes engineering solutions for potentially unstable sites or structures.

Education:

Brigham Young University
MS, Civil Engineering (Geotechnical), 1991

Brigham Young University
BS, Geology, 1988

Accreditations:
Registered Geologist, Oregon, G1650, 1995
Licensed Engineering Geologist, Washington, 2001

Gary L. Peterson, CEG
Engineering Geologist | Vice President
March 2005-present

Gary Peterson has more than thirty years of experience in engineering geology and project management, focusing on public sector and infrastructure markets. Technical responsibilities include geologic and geotechnical site characterization; seismic and landslide hazard assessment and mitigation; instrumentation and monitoring systems; tunnels, microtunnels, directional drilling and underground construction. His planning and land use experience includes several projects where he provided cities and counties with landslide hazard mapping and recommendations for code changes to allow improved risk management in landslide-prone terrain.

Relevant recent project leadership roles over recent years have included preliminary design studies for the Columbia River Crossing main river and Sough river crossings; design and construction of Spencer Creek Bridge, on US101 near Newport, Oregon; Willamette River Transit Bridge preliminary engineering services for Tri-Met; preliminary design through final design and construction of the $100M Lake Oswego Interceptor Sewer project; Balch Consolidation Conduit microtunnel and other elements of Portland's Big Pipe project; dewatering and instrumentation for emergency reconstruction Fern Ridge Dam; and design-build geotechnical lead for the Sandy River Crossing tunnel and shafts.

Professional Experience:

Shannon & Wilson, Inc., Lake Oswego, Oregon **3/05 to present**
Vice President | Office Manager | Engineering Geologist

As the Oregon Branch Manager in the Lake Oswego office, Gary's responsibilities include managing a growing office of geologists and engineers. He provides technical support in engineering geology related projects and assists project managers in project oversight, scoping and technical review. He also leads key projects as principal-in charge, including numerous high profile projects with no losses attributed to claims or legal actions. His key technical responsibilities include geologic/geotechnical site characterization; seismic and landslide hazard assessment/mitigation; instrumentation and monitoring systems; conceptual through final design support, construction documents and construction support.

Squier | Kleinfelder, Beaverton, Oregon **12/03to 2/05**
Senior Vice President | Senior Principal

As geotechnical group leader, Gary was responsible for operations of a 12 person geotechnical group including engineers and geologists. In that role he provided project oversight, assured appropriate staff allocation, reviewed and developed work scopes and provided technical review. Gary played a large part in Oregon's OTIA bridge program and was involved in over 100 bridge projects across the state.

Squier Associates, Lake Oswego, Oregon **3/82 to 12/03**
Project Geologist to Vice President

For over 21 years, Gary was the lead geologist, project manager and principal-in-charge for hundreds of geologic and geotechnical projects. Typical projects involved site characterization for soil and rock excavations and foundations; geologic hazard studies focused on stability, seismicity, and settlement. Numerous projects included heavy civil in-water construction. Numerous other projects involved seismic risk evaluations; linear infrastructure studies; foundations and retaining system design for major structures; and both soft ground and hard rock tunnels. Gary supports these projects through conceptual planning studies (including NEPA and EIS) through detailed geotechnical design, leading to final design, contract documents and construction observation. Gary is experienced with balancing natural process issues, including stream processes and sensitive species, with engineered stabilization methods to create sensitive, yet effective constructed works.

Foundation Sciences, Portland, Oregon **6/77 to 2/82**
Staff Geologist

Gary began his professional career conducting geotechnical investigations and heavy civil design studies, with a strong emphasis on rock mechanics testing and instrumentation. Projects included included 3 different segments of Chicago's Tunnel and Reservoir Program; nuclear power plant and waste isolation studies in Washington; and extensive in-situ rock mechanics testing to support dam stability studies on the Peace River, British Columbia.

Education:

Boise State University
BS, Geology, 1977

Accreditations:
Certified Engineering Geologist and Registered Geologist, Oregon, E845, 1982
Certified Engineering Geologist and Hydrogeologist, Washington, 522, 2002

Laura Peterson, P.E.
Structures Engineer
2008-present

Laura supports the Structures Engineering Manager in the oversight of the structural aspects of project development. Laura is also tasked with coordinating CEVP and VE workshops for the project.

Professional Experience:

WSDOT Southwest Region, Vancouver, Washington **4/06 to 8/08**
Assistant Constructability Engineer

Provided guidance to design teams from scoping through construction to improve constructability, biddability, and maintainability of projects, as well as to increase cost effectiveness.

Parsons Brinckerhoff, Portland, Oregon **4/96 to 11/01 and**
Structural Engineer **12/02 to 4/06**

<u>Project Management/Design</u>
Acted as project manager and/or lead designer for final design of numerous bridges, retaining walls, deck overlays, bridge retrofits, as well as building frames, foundations and appurtenances. Clients included WSDOT, ODOT, FHWA, Tri-Met, City of Vancouver, City of Portland, Caltrans, and ITD.

<u>Construction Support</u>
Provided design support during the construction of various light rail facilities, bridges and buildings. Included in these projects were the Tri-Met Westside and Interstate MAX light rail lines, the Eugene Transit Center, the Mill Plain Extension project, as well as numerous steel and prestressed girder bridges.

<u>Inspection/Load Rating</u>
Acted as lead bridge inspector on over 200 steel, concrete and timber bridges throughout the western United States. Performed load ratings on numerous bridges encompassing a wide variety of structure types.

WSDOT Bridge and Structures Office, Olympia, Washington **7/91 to 9/95**
Bridge Inspection Engineer, Bridge Design Engineer

<u>Bridge Preservation Office</u>
Responsible for administering the state bridge load rating program. Oversaw the development of WSDOT's *BRIDG for Windows* rating software, and managed consultant and staff efforts to complete rating s for a significant portion of the state's bridge inventory. Performed structural inspections on hundreds of state and local agency bridges.

<u>Bridge Design Office</u>
Acted as lead designer for final design of new and widened concrete bridges, and standard bridge barriers.

Education:

Washington State University, Pullman, Washington
M.S. Civil Engineering, May 1991
B.S. Civil Engineering, December 1989

Accreditations:
Professional Engineer, Washington, 1995
Professional Engineer, Oregon, 1997

Chivanna T. Pot, P.E.
Civil engineer
2006-present

Chivanna is the lead roadway engineer responsible for roadway design of the Oregon side of the project. He also serves as Parsons Brinckerhoff (PB) project manager. He has been with the Columbia River Crossing Project since April 2006. Chivanna is a supervising engineer with PB who brings more than 15 years of experience in roadway design and associated drainage and utilities. He also has experience in site development for retail, residential, transit, commercial and industrial projects. His highway experience includes horizontal and vertical alignments, as well as final design for interchanges and roadway improvements. Additionally, he brings experience with bridges crossing railroad tracks and coordination with the Federal Aviation Administration (FAA).

Professional Experience:

ODOT and WSDOT Joint Owners, Portland, Oregon **2006 to present**
Columbia River Crossing Environmental Impact Statement (EIS)
Lead Roadway Engineer / Project Manager

Civil engineer for conceptual design improvements for the Interstate 5 (I-5) corridor from Victory Boulevard to State Route 500 (SR 500), which includes mainline and interchange improvements. PB is a member of the design team completing a multimodal EIS for a new bridge, interchange improvements and a high-capacity transit system in the I-5 corridor from Delta Park in Oregon to SR 500 in Washington. The project will identify a preferred alternative for a new or improved crossing of the Columbia River between Portland and Vancouver. This work will outline potential environmental impacts (natural, ecological, social and economic) of each bridge option, to help ODOT and WSDOT select a preferred alternative and to guide final design and construction.

ODOT, La Grande, OR **2005 to 2006**
Oregon OTIA Bridge Replacement Program - Bundle 206: Interstate 84 (I-84) Irrigon Junction to Hilgard Interchange Bridge Repairs and Replacement, Eastern Oregon
Lead Civil Engineer

Lead civil engineer for taking this OTIA III bridge bundle from DAP to final design. The Highway 730 crossing under I-84 at Irrigon Junction was lowered to provide additional vertical clearance. In addition, a new 30-inch storm drain system and a water quality facility were provided at this site. At the Hilgard Interchange, the Highway 244 Bridge was replaced south of its current location over I-84 for additional clearance. The connecting on-and off-ramps were also re-aligned. Responsibilities include designing horizontal and vertical alignments, preparing temporary traffic control plan, signing and striping plan, storm drainage reports, and preparing design exception requests. Also responsible for estimates and coordination with OBDP and with private utility agencies.

Sound Transit, Seattle, WA **2002 to 2004**
Sound Transit Link Light Rail D520 Segments, Seattle, Washington
Lead Utility Design Engineer

Lead utility design engineer for an 800-foot, cut-and-cover tunnel under Pine Street for Link Light Rail’s north terminus. Responsibilities included the design of utility relocation, coordination with all utility owners, and preparation of the utility design report, and management of the potholing program. During tunnel construction, all utilities were suspended under the temporary roadway concrete deck to ensure that services would not be interrupted.

Sound Transit Link Light Rail D735 Segments, Seattle, Washington **2000 to 2004**
Lead Utility Design Engineer

Lead utility design engineer for Sound Transit’s C735 contract, consisting of a 4.5 mile at-grade light rail line. The design involves 29,000 lineal feet of watermain, 23,000 lineal feet of sanitary sewer including the relocation of approximately 4,800 lineal feet of trunk sewer (36” to 60”) and about 30,000 lineal feet of duct bank. Prepared the utility design report and the utility specifications.

Education:

Oregon State University, Corvallis, Oregon
B.S. Civil Engineering, 1993

Accreditations:
Professional Engineer in Oregon and Washington

Saundra B. Powell
Environmental Document Coordinator
2005-present

Professional Experience:

Parametrix, Portland, Oregon **07/2005 to Current**
Word Processing Lead

Saundra serves as the word processing lead for the Parametrix office in Portland, providing workload management and guidance to word processors on her team, including workload balancing, production coordination, and production quality checks. In this capacity, she is involved with nearly every document published in this office. Saundra works on an ongoing basis as a document coordinator with the independent Columbia River Crossing project team, including Parametrix technical and project management staff and staff from other subcontractors, to coordinate the editing, formatting, and production of the technical reports and EIS documents for the Columbia River Crossing project. She works closely with the Project Manager (Colin McConnaha) and technical report, BA, and EIS authors. She is also responsible for processing public comments for the CRC Communications Team. Some coordination with the Project Controls Team at CRC (Tonja).

Clackamas Community College, Oregon City, Oregon **06/2004 to 11/2004**
Special Projects Coordinator

Provided administrative support for special projects, including new construction and remodeling projects. Worked independently and within a team setting in a high-volume environment while prioritizing and monitoring workflow in order to meet deadlines. Generated and compiled reports, memos, correspondences, forms, and bid and construction documents. Maintained and updated project files, accounting systems, vendor billings, and new construction documents, including archiving and blueprinting files to support the Associate Dean of Campus Services. Performed a wide variety of secretarial and administrative support duties, specifically serving as a liaison between College Services Deanery and contractors, the general public, students, and the College staff of the various campus departments and divisions while maintaining strict confidentiality. Performed project accounting functions, accessed Datatel to create reports, prepared purchase orders, and printed budgeted and fixed asset information. Scheduled and distributed meeting minutes for College and Campus Services meetings. Maintained confidential training, evaluation information, and personnel reports. Scheduled and maintained records of work study/ part-time employees, including job descriptions, hours worked, overtime sheets, and timecards and payroll sheets. Answered telephones and fielded emergency and non-emergency calls accordingly. Adapated to stress and constantly changing priorities while prioritizing a multitude of tasks.

Lee Engineering, Inc., Oregon City, Oregon **08/1996 to 06/2002**
Project Coordinator, CAD Technician

Worked directly with Project Managers performing daily management tasks of projects and other work associated with project manager’s responsibilities. Involved through each phase of the project. Became familiar with/ developed knowledge of clients’ project scope, schedule, and budget in order to perform higher level of service for project managers and clients through the life cycle of the project. Involved in project team coordination, resource allocation and forecasting, project data research, and development of a general project understanding. Assisted with production of workplans and resource forecasting, designed criteria task lists, and developed project data sheets. Tracked budgets and developed Budget Status Reports, updated actual spent on budget and monitored and developed work schedules that included project performance and percent completes. Organized project files, insuring that all contracts and certificates of insurance were in order, and that projects followed company standards. Prepared letters, memorandums, and correspondence to clients, project team members, and subconsultants on a daily basis. Attended project team meetings, took minutes, prepared and distributed minutes. Maintained Quality Control Review Log for drawings at 50%, 90%, and 100% completion. Provided grant administration services for state funded projects. Developed graphic presentation materials as needed, assisted in preparation of project proposals and reports. Delegated assignments and tasks to administrative support.

Education:

Clackamas Community College, Oregon City, Oregon
Courses include architectural design and civil design using AutoCAD, Softdesk, 3-D Studios. Completed courses in mechanical drafting, technical mathematics, layout inspection, applied descriptive geometry, geo-dimensional tolerancing, and supervision. Recent courses include horticulture, welding, and bronze casting. Courses ongoing.

University of Oregon, Eugene, Oregon
Course work included American and English literature, journalism, graphics, advertising, German, architecture, and general studies. 1980 to 1983, 1988. B.A. English Literature.

Anne Pressentin
Communications Team
2006 – Present

Anne develops public information materials and supervises consultant communication staff for the Columbia River Crossing project. She writes and edits web text, fact sheets, news releases, display boards, presentations, speaking points and responses to written public questions using technical documents and interviews with engineers, planners and project managers. She drafts and edits communication and media strategy and reporting documents, tracks the creation of informational materials from inception to printing, and educates members of public at outreach events.

Professional Experience:

Anne is a professional communicator with three years experience as a consultant for EnviroIssues and 13 years experience as an employee of the Oregon Department of Fish and Wildlife and Idaho Division of Environmental Quality. She is adept at crafting and implementing communication and outreach plans, working with the media, and preparing materials to support all aspects of outreach.

Oregon Department of Transportation, Corvallis, Oregon — 2008-present

Interstate 5: OR-34 to Santiam River

Manage project to develop and populate two databases to support I-5 improvement project near Albany. The creation of stakeholder and cultural/natural resources databases requires stakeholder identification, interviews, literature reviews and oversight of architecture development. A technical memorandum will be created on the functions and operations of the databases.

City of Portland, Independent Police Review Division, Portland, Oregon — 2008-present

Strategic Communications Plan

Interview city staff and stakeholders, assess communications methods, develop strategic communications plan for the purpose of improving relations and transparency between the agency and stakeholders, Citizen Review Committee and the Portland Police Bureau.

Clark County Public Works, Vancouver, Washington — 2008

10^{th} Avenue Improvement

Directed effort to interview community members on a proposed road improvement project. Oversaw development of interview questions, project fact sheet and summary report.

Oregon Department of Fish and Wildlife, Salem, Oregon — 1999-2006

Public communications and media relations

Served as statewide and regional spokesperson for Oregon's fish and wildlife management agency. Created and implemented communications plans and news releases related wildlife policy, public health risks, recreation and viewing opportunities and public input initiatives. Increased level of respect for agency communications among journalists and stakeholders during tenure.

Idaho Division of Environmental Quality, Coeur d'Alene, Idaho — 1991-96, 1997-98

Public involvement and outreach

Education:

Indiana University, Bloomington, Indiana

M.P.A./M.S. Public Administration and Environmental Science, 1998

University of Washington, Seattle, Washington
B.A. Communications and Political Science, 1990

Mandy M. Putney
Consultant Communication Team Lead
2007 – Present

Mandy supports DOT's management, communication and transit teams by providing strategic advice on the Columbia River Crossing project's communication and public involvement elements, and is responsible for the day-to-day management of the project's consultant communications team. She has provided key input on development of communication and media plans, public information materials and outreach methods that will successfully lead to development of the Final Environmental Impact Statement and Record of Decision.

Professional Experience:

Mandy has eight years experience managing projects and involving diverse members of the community in local and regional planning and decision-making. She has worked at EnviroIssues as a Project Manager and Staff Manager for 4.5 years and has supported and managed communication plans on complex transportation projects such as the SR 520 Bridge Replacement and HOV Project in Seattle, WA.

ODOT, Salem, Oregon **2008 to Present**
Strategic Tolling and Pricing Communications Plan

Managing the development of a statewide communication plan to support future policy development in Oregon. Responsible for identifying stakeholders, developing and implementing outreach process, producing executive summaries for seven technical white papers, facilitating workshops, compiling comments and preparing a final report for the Oregon Transportation Commission.

WSDOT Seattle, Washington **2005 to 2007**
SR 520 Bridge Replacement and HOV Project

Served as Deputy Communications and Outreach Manager; developed and implemented communication strategy to engage and educate public for this complex and political project. Managed staff, facilitated internal and external project meetings, and coordinated with agency management and key staff at other large, regional transportation projects. Tracked budget and insured contract compliance.

WSDOT, Seattle, Washington **2005**
Alaskan Way Viaduct and Seawall Replacement Project

Developed follow-up strategy to maintain connections and keep traditionally underrepresented residents involved throughout project duration. Coordinated and attended briefings with social service agencies. Planned and staffed informational tables at ethnic and community events.

Student Conservation Association, Seattle, Washington **2002 to 2004**
Conservation Leadership Corps Program Manager

Managed all aspects of youth leadership and conservation service learning program for multi-cultural group of urban high school students. Hired and supervised staff; recruited and mentored youth, planned lessons and educational activities. Negotiated contracts with public agencies and raised funds; managed budget.

Education:

Antioch University, Seattle, Washington
M.A. Environment and Community, 2004

The Evergreen State College, Olympia, Washington
B.A. Emphasis on Environmental Issues and Community Response, 1997

Accreditations:
Member, Public Involvement Advisory Council, City of Portland, 2008 to present
Vice President, Women's Transportation Seminar (WTS), Puget Sound Chapter, 2006-2008

Sharon Rainsberry
Biology Lead for the Columbia River Crossing Project (CRC)
2/2009 to present

Facilitate a complex large multi-modal transportation project through the Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA) consultation process with U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Federal Highway Administration, Federal Transit Administration, and other major stakeholders. Serve as team lead in organizing and preparing a biological assessment and MMPA Letter of Authorization. Meet with the USFWS, NMFS and other organizations to address their concerns with the project. Work with CRC environmental, engineering, traffic, and transit teams to coordinate information and develop avoidance and minimization measures for ESA listed fish species in the Columbia River. Assist project staff with providing information needed to move the project through the consultation process. Coordinate with Oregon Department of Transportation.

Professional Experience:

Washington State Department of Transportation, Olympia, WA **2/2008 to 2/2009**
Senior Biologist

Developed and evaluated agency guidance and processes related to the protection of fish, wildlife, and habitats. Prepared and provided technical assistance and training on fish and wildlife issues in the form of standards and guidance for WSDOT Regions, Modes, and Headquarters staff that emphasize compliance with federal ESA and other environmental regulations related to fish, wildlife, and habitat. Represented WSDOT as a technical expert on fish/wildlife and transportation issues at internal and external meetings, interagency task forces, and committees. Coordinated WSDOT's qualification program for consultant biological assessment authors and taught section of the Biological Assessment Preparation Seminar for Transportation Projects. Reviewed biological assessments and environmental documentation for compliance with regulations and WSDOT policies. Oversaw development of and assisted with writing an Incidental Harassment Authorization for nine marine mammal species. Coordinated hydroacoustic monitoring plan template with hydroacoustic leads from WSDOT, NMFS and USFWS.

Washington State Department of Transportation, Olympia, WA **11/2004 to 2/2008**
Biologist

Prepared biological assessments for transportation projects through sites reviews, identification of projects' effects on fish and wildlife resources, and recommendations for minimizing adverse effects. Provided technical assistance on ESA policy and procedures and fish and wildlife issues related to project development. Reviewed biological assessments and discipline reports. Conducted ESA section 7 consultations while on temporary detail at the U.S. Fish and Wildlife Service. Wrote training and policy materials for interagency and consultant use. Coordinated and taught sections of the Biological Assessment Preparation Seminar for Transportation Projects and assisted in coordination of qualification program for consultant biological assessment authors.

U.S. Fish and Wildlife Service, Lacey, WA **12/2003 to 11/2004**
Volunteer

Conducted informal consultations for section 7 of the Endangered Species Act. Developed a multi-metric index using qualitative benthic macroinvertebrate data from 28 rivers. Assisted in habitat and snorkel surveys in the Cedar River and Lake Washington.

Education:

University of Washington, Seattle, WA
Master of Science in Fisheries

California State Polytechnic University, Pomona, CA
Bachelor of Science Degree in Biology

Devin R. Reck, E.I.T.
Assistant Highways Engineering Manager
2008 - Present

Assists in the management of all highway work for the Columbia River Crossing project, including consultant and Department staff. Provides advice to the project's Management Team on engineering related issues and expenditures.

Professional Experience:

WSDOT, Kelso, Washington **2/08 to 10/08**
Assistant Project Engineer

Assisted in the oversight, management and delivery of multiple design and construction projects in the Kelso Area Engineering Office with emphasis of on-time and on-budget. Assisted in the overall supervision of all engineers, technicians, surveyors, and office staff who worked on the design, development, and administration of the design and construction projects. Assisted in the coordination with public utilities, public agencies, and contractors.

WSDOT, Kelso, Washington **4/05 to 2/08**
Transportation Engineer III

Managed multiple design and construction projects and supervised a team of engineers and technicians in the Kelso Area Engineering Office. Utilized a thorough working knowledge of agency policies, standards and procedures as well as engineering principles, methods, practices and judgment in selecting and adapting techniques to solve transportation problems. Represented the Department at public meetings, open houses, to local agencies, contractors, consultants, etc., for specific projects. Was called on to assign, train and evaluate engineers and technicians.

WSDOT, Kelso, Washington **9/03 to 4/05**
Transportation Engineer II

Served as lead design engineer and construction inspector on several projects within the Kelso Area Engineering Office. Utilized independent application of standard engineering procedures and techniques to accomplish a wide variety of work in the office, laboratory, and field. Provided assistance when problems were encountered and reviewed completed work.

WSDOT, Kelso, Washington **3/02 to 9/03**
Transportation Engineer I

Performed a variety of beginning level transportation engineering work.

Education:

Walla Walla College, College Place, Washington
Bachelor of Science in Engineering, 2002

Accreditations:
Engineer-in-Training in Washington

John Replinger
Senior Transportation Engineer
2007 - Present

Replinger is involved in a variety of transportation planning and traffic operations related tasks for the CRC project. These include preparatory work on Oregon's interchange area management plans; assistance with pedestrian and bicyclist issues including forecasting of future use in the corridor; preparation of documentation supporting Interchange Justification Reports/Interchange Modification Requests required by FHWA for seven interchanges; and support for Transportation Demand Management and Transportation System Management elements of the project.

Professional Experience:

Replinger's career of 30+ years includes employment in the public and private sectors. His expertise includes long-range, multi-modal transportation plans, transportation-land use relationships, bicycle and pedestrian planning, transit, and transportation demand management. Replinger is a Senior Associate with David Evans and Associates, Inc.

David Evans and Associates, Inc., Portland, Oregon **8/2003 to Present**
Senior Transportation Engineer

Replinger has served as project manager or engineer for a variety of projects including preparation of Interchange Area Management Plans for several interchanges along I-5 in southern Oregon, 20-year transportation system plans for small cities, and traffic impact studies relating to street projects or land development projects.

Multnomah County, Portland, Oregon **8/2001 to 8/2003**
County Traffic Engineer

Replinger managed the operations of the County's traffic section providing guidance on operations of the County's road system comprising almost 400 miles of urban streets and rural highways. The system included more than 120 signalized intersections. He oversaw signal system operations, maintenance, new installations, and upgrades.

David Evans and Associates, Inc., Portland, Oregon **12/1993 to 8/2001**
Senior Transportation Engineer

Replinger served as project manager or engineer for 20-year transportation system plans for small cities, the regional transportation plan for the Medford, OR region, and traffic impact studies for a stadium in downtown Portland, residential, commercial, institutional, and industrial developments in Oregon and Washington.

JRH Transportation Engineering, Eugene, Oregon **7/1991 to 12/1993**
Transportation Engineer

Replinger participated in long-range plans for Butte County, CA, and Anchorage, AK, prepared bicycle plans for three communities in Oregon, and prepared the traffic analysis for an EIS for a bridge project in Eugene, Oregon.

Lane Council of Governments, Eugene, Oregon **5/1978 to 7/1991**
Senior Program Manager

Replinger participated in and eventually guided all aspects of the federally-mandated transportation planning process for the Eugene-Springfield area and managed development of the region's multi-modal, 20-year transportation plan.

Champaign County Regional Planning Commission, Urbana, Illinois **5/1974 to 7/178**
Transportation Planner

Replinger participated in and all aspects of the federally-mandated transportation planning process for the Urbana-Champaign area and worked on transit, bikeway and street planning projects.

Education:

University of Illinois, Urbana, Illinois
B.S. in Civil Engineering, 1976
B.A. in Liberal Arts and Sciences, 1976

Accreditations:

Professional Engineer in Oregon (10518), Washington (32911) and California (50421)

Lynn Rust, PE
Assistant Deputy Project Director
2007-present

As the Assistant Deputy Project Director of the Columbia River Crossing Project, Lynn is responsible for the oversight of engineering, transit, and project controls lines of the Columbia River Crossing Project.

Professional Experience:

WSDOT, Vancouver, WA **4/98 to 7/05**
SW Region Construction Support Engineer, Assistant Area Engineer, Acting Area Engineer

Provided support to 4 construction offices. Duties included change order approvals for contracts and advice on claims. SW Region Material's lab, SW Region Construction trainer, and Documentation Engineer reported to this position. Supervised 30 employees in a Construction/Design office administering a $45 million I-5 widening project.

WSDOT, Longview, WA **11/96 to 04/98**
Assistant Area Engineer, Office Engineer

Supervision of construction/design office including designers, inspectors and survey crews. Various projects including pavers, bridge painters, rockfall projects, and small improvement projects.

WSDOT, Vancouver, WA **05/93 to 11/96**
Traffic Analyst, Engineering Records and Construction Administration, Design Engineer

Developed and implemented traffic signal timing plans. Performed special traffic studies. Reviewed and processed change order. Monitored funding for SW Region construction contracts. Advised field office personnel on specification interpretations.

WSDOT, Wenatchee, WA **04/91 to 05/93**
Design Engineer, Inspector, Surveyor, Material's Tester

Prepared Plans, Specifications and Estimate package from design report utilizing CEAL. Substitute as Party chief as needed for topogging, setting benchmarks and centerline, downloaded and edited data. Inspected all aspects of construction projects including testing.

FHWA, Various **07/87 to 07/90**
Assistant PE, Inspector, Party Chief, Computer Programmer

Ensured compliance with specifications for preliminary surveying, staking , inspection of clearing and grubbing, blasting, subgrade, drainage, crusher operations, baserock, asphalt plant inspection paving, traffic items, concrete structures, revegitation, signing. Projects in 6 locations in Washington and Idaho. Included writing and implementing time and attendance program for Project Engineers offsite for purpose of getting paid for appropriate hours.

Education:

South Dakota State University, Brookings, SD
Bachelor of Science in Mathematics, 1986
Minor in Computer Science, 1986

Accreditations:
1998 Professional Engineer's License, Washington State
1997 Professional Engineer's License, Oregon State

Dennis Sandstrom
Associate I, EnviroIssues
2009-present

Dennis supports the communications and public involvement activities for the Columbia River Crossing project by coordinating the outreach schedule and conducting community outreach. Dennis implements the communications plan through production of meeting materials, coordinating with project partners and interested neighborhoods, and planning and attending open houses, workshops, advisory group meetings and community festivals. He also manages the tracking system for large amounts of information and is responsible for reporting public engagement progress and needs.

Professional Experience:

Port of Portland, Portland, OR **1/09 to 6/09**
Airport Outreach Coordinator

Created and implemented strategic communication plans for Port projects. Assisted with public involvement efforts for a variety of other Port projects. Wrote and created communication materials, including fact sheets, displays, and handouts. Assisted with planning and implementation of events. Regularly contributed articles for internal and external publications. Managed and responded to inquiries sent to the Port's Web site. Participated in tours and other educational outreach efforts, including presentations at neighborhood association meetings, tours of Port facilities, and other Port events. Provided research support on as-needed basis. Organized Port Intern Development Program.

Port of Portland, Portland, OR **9/07 to 01/09**
Public Affairs Intern

Regularly contributed articles for internal and external publications. Managed and responded to inquiries sent to the Port's Web site. Participated in tours and other educational outreach efforts, including presentations at neighborhood association meetings, tours of Port facilities, and other Port events. Provided research support on as-needed basis. Organized Port Intern Development Program

Sierra Service Project, Sacramento, CA **6/07 to 9/07**
Office Assistant

Set up and implemented new constituent tracking software, PhilanthrAppeal. Trained office staff on the use of PhilanthrAppeal. Created and edited 2007 Fall Newsletter. Created and edited 2008 Registration Packet. Provided customer service.

Sierra Service Project, Tsaile, AZ **06/06 to 8/06**
Site Director

Oversight of overall camp experience for over 300 high school-age campers and adult counselors. Trained and supervised six staff members. Responsible for site budget of $50,000. Developed and maintained relationships with Native American hosts. Oversaw development of weekly program.

Education:

Portland State University, Portland, Oregon
Masters in Public Administration

San Diego State University, San Diego, California
Bachelor of Arts, Liberal Studies, Cum Laude

Leslie Schwab
Cultural Resources Specialist/Architectural Historian
2006-present

Primarily, Ms. Schwab's responsibilities focus on cultural resources issues on federally-funded transportation projects ranging in size from large, multi-million dollar projects (including the Columbia River Crossing project) to small, local agency-sponsored projects. Her current position with the WSDOT entails reviewing and writing cultural (historic) resources technical reports and technical memoranda for compliance with Section 106 of the National Historic Preservation Act. Additionally, Ms. Schwab reviews draft Environmental Impact Statements and Environmental Assessments (NEPA) for technical accuracy related to the impacts and the significance of impacts to historic resources caused by federally-funded transportation projects, and manages the activities that will cause the Department to be in compliance with cultural resources laws/regulations.

Professional Experience:

Washington Department of Transportation, Olympia, WA **7/06 to 1/09 (present)**
Cultural Resources Specialist

Leslie manages the cultural resource issues (historic architectural and engineering resources) for multiple federally-funded and state-funded projects for the Department, with the goal of reaching compliance with local, state and federal laws that pertain to historic preservation of cultural resources (Local landmarks board permitting processes, SEPA, NEPA, Section 106 of the National Historic Preservation Act, and Section 4(f) of the Department of Transportation Act). Currently, Leslie is working on the Columbia River Crossing project (Vancouver, WA), and the SR 99: Aurora Avenue Bridge Fence Project (Seattle, WA), along with smaller EA/EIS-level projects in the Southwest and Olympic Regions of WSDOT.

Oregon Department of Transportation, Salem, OR **12/98 to 7/06**
Cultural Resources Specialist

Leslie managed the cultural resource issues (historic architectural and engineering structures) for multiple federally-funded and state-funded projects for the Department, with the goal of reaching compliance with several state and federal laws that pertain to historic preservation of cultural resources (ORS 358, NEPA, Section 106 of the National Historic Preservation Act, and Section 4(f) of the Department of Transportation Act). Noteworthy accomplishments in the preservation of historic resources in Oregon include the rehabilitation and cathodic protection of the Rogue River (Gold Beach) Bridge; the rehabilitation and widening of the Umpqua River (Winchester) Bridge; and assisting in the large-format, archival photography of the Oregon Coast Bridges, the Portland Bridges, and Oregon's covered bridges.

City of Albany, Albany, OR **5/98 to 9/98**
Historic Preservation Planning Intern

During Leslie's graduate studies at the University of Oregon, she interned with the Preservation Planner for the City of Albany, Oregon. Her duties included updating the survey and inventory of the National Register-listed Downtown Albany Historic District, which included photographing the buildings, writing descriptions of the contributing and non-contributing structures within the district, and evaluating the relative integrity of each structure.

Kreps and Kreps Architects, Charleston, WV **2/96 to 3/97**
Architectural Intern

Ms. Schwab created and edited architectural construction documents utilizing AutoCAD (a Computer Aided Drafting and Design program), and designed buildings and building additions for client review.

Historic American Buildings Survey (HABS), Washington, D.C. **6/94 to 5/95**
HABS Architect

Ms. Schwab produced measured drawings of Anasazi Indian ruins located in Mesa Verde National Park and Hovenweep National Monument. This position utilized photogrammetric techniques to develop measured drawings from photographs and site plans of these archaeological features.

Education:

University of Wisconsin, Milwaukee, WI
Bachelor of Science in Architectural Studies (1992)
University of Oregon, Eugene, OR
Graduate studies in Historic Preservation (ABT, 2001)

Lou Schwab
Right-of-Way Project Manager
2002-present

Manages and supervises project teams for r/w acquisition projects. Tasks include the following:

1. Manage schedules to meet project deadlines.
2. Assigning acquisition and relocation tasks to project staff.
3. Reviewing and approving completed relocation studies, relocation claims, purchase agreements.
4. Instructing and mentoring acquisition staff in r/w practices and procedures.
5. Serving as the primary r/w contact for the client and other members of the project team.
6. Handles difficult and complex r/w acquisitions and relocations.
7. Serves as a member of multidisciplinary project teams as an r/w subject matter expert, producing r/w cost estimates and technical documents as needed.

Professional Experience:

ODOT, Portland, OR **1998-2001**
Technical Support Manager

Supervise and manage an organizational unit which included engineering specialists in Utilities Relocation, Local Agency Program, Bicycle/Pedestrian program, and Quality Assurance Program.

ODOT, Salem, OR **1996 to 1998**
Right of Way Engineering Manager

Manage R/W Engineering Unit , responsible for creating r/w descriptions, maps and exhibits for ODOT projects.

ODOT, Salem, OR **1988-1996**
Assistant Right of Way Manager

Manage and direct the r/w field acquisition activities. Supervise five region r/w Supervisors. Approve all real estate agreements and legal settlements.

ODOT, Salem, OR **1986-1987**
Region 1 R/W Supervisor

Manage ODOT Region 1 Right of Way office including all acquisition and property management activities in the region.

ODOT, Salem, OR **1978-1984**
Senior R/W Agent

Serve as a lead technical specialist in property management, relocation, and appraisal review.

ODOT, Roseburg, OR **1971-1977**
Right of Way Agent

Provide appraisal, acquisition, relocation, and property management functions in the Region 3 right of way office.

Education:

Oregon State University
Bachelor of Science, Forest Management

Accreditations:
Senior Right-of-Way Agent, International Right-of-Way Association

Cheryl L. Sclafani
Senior Transit Analyst
2010-Present

Track Lead for the transit team providing design and direction regarding track, special trackwork and station interface; coordination of track design with multiple disciplines within the project and with agencies; development of preliminary set of plans with exceptions summary.

Professional Experience:

David Evans and Associates, Portland, OR **10/09 to Present**
Sr. Track Designer

Track Designer responsible for updating the conceptual design of the Peninsula Terminal Railroad mainline and BNSF/Port of Portland connection. Updated quantities and exhibits for funding application. Roadway Designer responsible for reviewing the I-5: Marine Drive to Victory Boulevard braid ramp and I-5 widening conceptual design to ODOT standards. Refined the alignments and produced a total area of disturbance for environmental documentation.

Regional Transportation District, Denver, CO **7/06 to 09/09**
Sr. Civil Engineer, Trackwork

Track Lead for the Elati Light Rail Maintenance Facility North Yard Expansion Project which added 6,000 feet of track to the existing yard to store an additional 25 light rail vehicles. Led conceptual to final design, developed preliminary, final design, issued for bid and issued for construction plans, specifications and estimates and provided engineering support during project construction. Track Lead for the Burnham Yard Lead Track Relocation Project which relocated the existing lead track into the yard to accommodate the new West Corridor LRT. Led preliminary to final design and developed preliminary and final design plans and estimates. Agency Reviewer for track and related elements for the North Metro Corridor and Gold Line basic and preliminary engineering plans.

HDR Engineering, Denver, CO **11/05 to 7/06**
Transportation Engineer

Track Designer for OmniTrax Great Western Industrial Park (GWIP) Siding/Lead Track Project which added a new freight mainline siding and lead track to service GWIP. Developed final plans and engineering support during project construction.

PBS&J, Denver, CO **02/02 to 11/05**
Design Engineer III

Track Lead for the East Corridor EIS, a 23-mile transit corridor that will connect downtown Denver to the Denver International Airport. Developed designs and cost estimates for transit and freight rail alternatives and provided engineering technical support during working group and public meetings. Drainage Designer for the South I-25 Corridor Project which added a new interchange at Ridgegate and lanes along I-25 as well as a new frontage road between the new interchange and Castle Pines Parkway Interchange. Developed preliminary and final plans, estimates and hydrology and hydraulics reports.

PBS&J, Dallas, TX **12/99 to 2/02**
Design Engineer II

Roadway Designer for rural highways, state highways and intersections in Texas. Developed preliminary and final design roadway and drainage plans, specifications and estimates. Also, responsible for
HEC-RAS modeling of road creek crossings and preparation of hydraulics reports for these projects.

Education:

Texas A&M University, College Station, TX
B.S. in Civil Engineering

Accreditations:
E.I.T. Texas (26724) – Transferred to Colorado
E.I.T. Colorado (61432)

Steven M. Siegel
President, Siegel Consulting
1988 - present

Siegel Consulting is a consulting firm focusing on project and program funding, managing public and public-private infrastructure and development projects, transportation analysis, and development. Siegel Consulting has specialized in transportation; and has prepared and implemented finance plans for the Westside LRT Project, Hillsboro LRT Extension, Interstate LRT Project, I-205 LRT Project, Commuter Rail Project, Mall LRT Project, and Milwaukie LRT Project in Portland, Oregon.

As Regional Policy Coordination consultant for TriMet, Siegel Consulting has analyzed reauthorization bills, prepared proposed language and back-up materials required by Congressional delegation and staff. Prepared analyses of FTA proposals regarding New Starts evaluation processes, developed regional consensuses on project priorities and prepared state legislation for transportation funding initiatives. As financial consultant to Metro, assisted in preparing the Regional Transportation Plan.

Steven Siegel also served as Project Manager for the Convention Center project, including designing and implementing the finance plan for this project. Also, on behalf of City of Portland, managed negotiations with Portland Trail Blazers on development of the Rose Garden, including designing and implementing the finance plan for the City's share of this project.

Professional Experience:

Siegel Consulting, Portland, Oregon **1988 to Present**
President

Practice focuses on project and program funding, managing public and public-private infrastructure and development projects, land use, and development. Clients have included TriMet, Portland Development Commission, Washington County, Oregon, Oregon Department of Transportation, Washington State Department of Transportation, Metro, Port of Hood River, Portland Trail Blazers, and Intel.

Steven Siegel, Attorney at Law **1999 to 2007**
Attorney

Was licensed to practice in Oregon; currently on inactive status. Practice focused land use and real estate development. Clients included Downtown Development Group, Singer Properties, Gerding-Edlen Development, Carroll Development, Harsch Development, City Center Parking, and others.

Portland Development Commission, Portland, Oregon **1987 to 1988**
Special Director of Convention Center Development

Managed City of Portland issues regarding the funding and development of the convention center. Also assigned to Mayor Clark's office to facilitate Portland convention business.

Metro, Portland, Oregon **1977 to 1986**
Director of Planning, (final position)

Oversaw department of thirty planners responsible for regional transportation, urban growth boundary and regional land use, regional infrastructure programs, and development of the Oregon Convention Center.

Education:

Polytechnic Institute of Brooklyn, Brooklyn, NY
Bachelor of Science in Industrial Engineering (Operations Research) -- 1968

State University of New York at Buffalo, Buffalo, NY
Master of Science in Industrial Engineering (Operations Research) -- 1972

Lewis and Clark College of Law, Portland, Oregon
Juris Doctor -- 1999

Cathy S. Silins
Assistant Director, Public Transportation Division

Professional Experience:

Washington State Department of Transportation **1987 to present**

As a senior leader at WSDOT responsible for overseeing numerous programs, directly managing a budget in excess of $100 million in both federal and state funds, and overseeing and supporting the work of staff within the Division.

Primarily accountable for:

- all coordinated public transportation programs. Work includes developing strategic relationships and solving problems by coordinating with federal and local governments, tribal governments, municipal corporations, for profit and nonprofit transportation agencies, state and local social service organizations, school districts, major employers, etc.
- providing critical leadership and facilitating change resulting from evolving needs of the external and internal environment.
- directing the Division through public policy development and integrated planning responsibilities that have a significant influence on other organizations inside and outside the agency.
- focusing on short-term, mid-term and long-term goals. Integrating and balancing near term opportunities and responsibilities with long-range strategic objectives.
- exercising leadership and creating a vision and strategies for division programs that are aligned with Department values.
- developing Legislative strategies for policy and budget issues related to program advocacy and growth.
- acting in the public's best interest as a good steward of their resources, improving service quality and organizational performance.

Whatcom Transportation Authority, Bellingham City Transit **1981 to 1987**
Bellingham, WA
Administrative Coordinator

Responsible for all aspects of budget, financial management, federal and state grants, procurement, personnel and labor negotiations, public relations, short-term and long term planning, and oversight on service contracts to include the complementary paratransit services provided by a nonprofit organization. Represented the transit agency before elected officials, planning boards, civil service councils, the public and the media. Provided assistance in the transition of Bellingham City Transit system from a rural system to a small urban system, and from a city-operated transit agency to a separate municipal corporation of a public transportation benefit authority.

Education:

Western Washington University, Bellingham, WA
Masters of Arts in Political Science/Politics & Government and Public Administration
June 1983

South Dakota State University, Brookings, SD
Masters of Education in Guidance, Counseling & Personnel Services
August 1978

Victoria R. Smith, P.E.
Transit Project Manager, David Evans and Associates, Inc.
2008-present

Vicky will manage the transit team, coordinating the consulting staff in development of the preliminary engineering documents. Ms Smith will coordinate with the CTRAN and TriMet staff managing the project as well as coordinate with the consultant Task Leads responsible for the other elements of the project.

Professional Experience:

Vicky Smith has more than 18 years of experience as an engineer and project manager on a variety of design and construction projects, the majority of which have been on large light rail infrastructure projects. She has prepared plans, specifications and provided construction management services both as an owner and consultant. She has worked closely with operations and maintenance staff to design and implement line extensions and system upgrades. Ms Smith has provided peer reviews on other light rail system projects during design.

I-205 LRT Project, TriMet, Portland Oregon — 2006-present

During the design effort on TriMet‘s 5.6-mile light rail extension to Clackamas Town Center, Ms Smith was responsible for leading the civil system integration for the design team lead by DEA. In addition she coordinated the development of the specifications for the project which consolidated State City and Agency specifications into a single specification to be used by the Design Builder. Following the on time completion of design, Ms Smith transitioned into the field with the Design/Builder as the lead field representative managing the design support services during construction for DEA's team.

Interstate MAX LRT Project, TriMet, Portland, Oregon — 2002-2004

In her position as Project Integration Manager at TriMet, Ms. Smith provided oversight and guidance to TriMet's Quality Assurance Program for TriMet's 5.8-mile light rail extension to the EXPO Center and established the Safety and Security Task Force to review the public and transit operational safety and security of the as-constructed light rail system prior to the start-up of this extension. The committee consisted of bus and rail operations and maintenance staff, safety and security staff, community relations staff as well as TriMet project team representatives.

Airport MAX, TriMet, Portland, Oregon — 1997-2002

As the Engineering and Construction Manager, Ms. Smith was responsible for ensuring that TriMet successfully opened a 5.5-mile high quality light rail extension by September 2001. The $125 million design-build project was the first public/ private light rail project in the nation and the first design-build light rail project for TriMet.

Ms. Smith was responsible for managing the work of the D/B and coordinate TriMet's interface with the project. Ms Smith worked with the D/B to develop the Project's Program Requirements that became the guiding document for defining the expected deliverable for the budget established by the public/ private partnership.

Double Track and Ruby Junction Expansion Project, TriMet, Portland, Oregon — 1994-1996

As project manager, Ms. Smith managed the design and construction of 2.5-mile addition to the existing Banfield system. This was TriMet's first significant project built within its operating system environment. As a result, Ms Smith worked with the construction contractor and operations and maintenance staff to develop a process for coordinating work within the operating corridor, including the hourly work program developed by the contractor, identification of TriMet equipment and staff support, service level impacts and the prestart-up inspection and testing.

Education:

Portland State University, Portland, Oregon
B.S., Civil Engineering, 1985

Accreditations:
Professional Engineer in Oregon, 1990

Theodore C. Stonecliffe, P.E.
Transit Planner
2006-Present

Theodore supports the transit planning efforts including the preparation of the transit portion of the FEIS and FTA New Starts update. Tasks include the definition of transit alternatives, development of modeling packages, task lead for operations and maintenance (O&M) costing, public outreach support, and task lead for transit-related field studies. He has performed park-and-ride utilization studies, on-board surveys, travel time field measurements, and development of full system schedules using C-TRAN's scheduling software, TMS, for accurate O&M cost estimation.

He is actively involved with the modeling support team and prepares the modeling packages as agreed by the group. He was involved in the preparation of the Transit Technical Report for the DEIS and the Final Definition of Transit Alternatives for the New Starts submittal in September, 2008. He led the development of the New Starts Definition of Alternatives Report and the O&M cost memos for the New Starts submittal.

Professional Experience:

Theodore has had a variety of transportation planning and engineering experiences over his ten year career. He prepared a traffic safety analysis for the CRC project before joining team transit. He has both design and construction engineering experience while working for Caltrans including responsible charge of two engineering projects during his six year tenure. He entered into the transit planning field in March, 2006. He has worked for David Evans and Associates, Inc., prime consultant for the CRC project since June, 2005.

ODOT and WSDOT Joint Owners, Portland, Oregon **12/05 to 3/06**
Transportation Engineer, Columbia River Crossing Project

Performed traffic safety analysis of five mile section of I-5 using DOT crash data and prepared a report documenting the safety deficiencies for the CRC project.

California Department of Transportation, Oakland, California **8/98 to 8/04**
Transportation Engineer (Civil)

- Precast Concrete Jacket Lead Engineer (1/03 – 8/04) and Foundations Construction Field Inspector (2/02 – 1/03), $914M Richmond-San Rafael Bridge Seismic Retrofit Project, Richmond, CA
- Project Engineer, $30M Posey/Webster Tube Seismic Retrofit Project, Oakland, CA, 4/99 – 1/02
- Staff Engineer, $50M Project 16 of the Seismic Retrofit of the Western Span of the San Francisco/Oakland Bay Bridge, Oakland, California, 1/99 – 11/99
- Staff Engineer, $12M Hwy 130 Bridge Replacement Project, Santa Clara County, CA, 6/99 – 1/00

Education:

University of California, Berkeley, CA
M.S. Civil and Environmental Engineering, 2005

Washington University, St. Louis, MO
B.S. Civil Engineering, 1998

Accreditations:
Professional Engineer in Washington, Oregon, and California

Michael W. Stricker
Washington State Department of Transportation (WSDOT), Relocation Program Supervisor & Local Public Agency Liaison
1996-present

Professional Experience:

WSDOT, Vancouver, WA **12/1996 to Present**
Relocation Program Supervisor & Local Public Agency Liaison

For the past 9 years I have been the Southwest Region Relocation Program Supervisor. I have supervised 2 Right of Way Agents carry out relocation assignments on federally funded projects. I review these agents work, as well as prepare rent supplements, price differentials, and moving expense claims. I investigate and determine eligibility for relocation payments. I also prepare relocation studies for the revised fund requests for appraisals, prepare escrow instructions for replacement home closings, calculate moving cost estimates, and monitor moves.

The LPA Liaison for the Southwest Region is responsibility to perform all file reviews of right of way acquisition on federally funded transportation projects in the region. The coordinator approves all right of way acquisition for City, County, Port, Transit, and many other municipalities that receive federal aid. Another important duty of this position is to provide technical and advisory services from the planning phase and up to the completion of the acquisition and relocation phase to ensure that right of way is acquired on LPA projects according to state and Federal laws and Federal Highway Administration directives.

I have worked at WSDOT for 12.75 years, and during the threat of a RIF in the spring of 2000, I worked out of the South Central Region's Real Estate Services Office. I am an alumni of the University of Portland, in Portland, Oregon, and my wife Luanne and I have 4 boys at home.

ERA Borge/Ledoux Real Estate, Vancouver, WA **3/95 to 11/95**
Real Estate Salesperson

As a residential real estate salesperson, I followed real estate transactions through to closing. I listed property for sale, handled inspections, clouded titles, and buyer's remorse and seller's remorse. I ordered appraisals and reviewed appraisals for clients.

MS Property Management, Vancouver, WA **9/87 to 96**

I operated my own property management business. I provided property management services for residential and commercial properties. These properties include a single tenant and multi tenant retail building, and three single family residential homes. I negotiate and prepare rental agreements, and handle ongoing tenant relations. I provide rental budgets, computerized monthly accounting and tenant screening.

Education:

University of Portland, Portland, Oregon
Bachelor of Science, Communications Management – 1983

Kris Strickler, PE
Deputy Project Director, Columbia River Crossing Project
2004 – Present

As the Deputy Project Director, responsible for directing the project development and implementation programs for the Bi-state Columbia River Crossing Project and the affiliated projects in concert with the Project Director. The responsibilities for this work program include: program management, oversight from scoping through completion of construction, developing policies, providing policy direction to the staff and teams of consultants, developing partnerships with agencies and local jurisdictions as well as Bi-state jurisdiction partnerships and ensuring the coordination of communication strategies.

Responsible for oversight of the environmental phase of the project, plans preparation, specifications and construction activities. The position will manage the engineering staff and directly influences work of that staff as well as consultant staff. Responsible for providing support, identifying issues, anticipating potential consequences, and advising the Project Director and the project teams in matters concerning design, construction, maintenance, environmental permitting, traffic and local support services.

Professional Experience

WSDOT, Vancouver, Washington **2002 to 2004**
Assistant Area Engineer

- Responsible for oversight, management and delivery of design and construction projects in the Clark County area of Southwest Washington.
- Manage engineers and technicians with the intent of delivering the departments program.
- Manage several projects at one time with emphasis of on-time, on-budget delivery.
- Knowledge of environmental laws, regulations and issues and how they relate directly with the department.

WSDOT, Vancouver, Washington **2001 to 2002**
Design and Construction Team Leader

- Serve as Design Team Leader/Chief Inspector for multiple projects within the Clark County area of the Southwest Region of WSDOT.
- Management of team of professionals, both agency and consultant, with intent on delivery of the projects assigned.
- Some project management duties are: utilize the MPD process for projects, prepare and monitor schedules, monitor project funding, maintain project files, coordinate with support groups and local agencies, prepare and present public meetings, review contract plans and special provisions, prepare final records, generate as-builts, prepare change orders, and negotiate with contractors.

WSDOT, Vancouver, Washington **1999 to 2001**
Designer / Inspector

- Served as lead designer on several projects within the office; generating special provisions, reviewing plans, specifications, and estimates for others within the team.
- Compiled and calculated backup information for agreements associated with construction contracts.
- Prepared and presented public information meetings regarding impacts associated with the construction of office projects.

Education

Washington State University
Bachelor of Science in Civil Engineering - 1998

Professional License
Professional Civil Engineer – State of Washington #39922

John Swiecick
Senior Communications Engineer
Capital Projects & Facilities Division
2001-present

Coordinate communication system and related engineering activities in TriMet's Capital Projects division and with TriMet's Information Technology department. Designer and Resident engineer for WES Two Way Radio procurement. Designer and Resident Engineer for WES CTC system. Supervisor for CCTV installations throughout District. Provide technical support to TriMet communications maintenance group. Designer and Resident Engineer for control center upgrades to support Green Line additions. Designer and Resident Engineer for Transit Tracker procurements for WES and Mall projects. Technical support to TriMet Bus Dispatch and Radio Replacement project. Liaison to State of Oregon OWIN radio replacement project. Liaison to Portland Regional Radio Replacement project. Liaison to Region 35 700 Megahertz radio plan project. Chair of Information Technology Committee.

Professional Experience:

LTK Engineering Services, Portland, OR **1994 to 2001**
Senior Communications Engineer

Communications engineer, TriMet Westside Project; Systems Integration Manager, TriMet Westside Project; Communications Engineer, Hiawatha Corridor Light Rail Project; Communications Engineer, Sound Transit Light Rail Project

Bay Area Rapid Transit District, Oakland, CA **1989 to 1994**
Supervising Project Engineer

Supervised communications and signals procurements for BART Extensions Program—25 miles of extensions, and supervised integration between new and existing systems.

Bay Area Rapid Transit District, Oakland, CA **1986 to 1989**
Senior Communications Engineer

Designed, procured, and integrated communications systems throughout the District: Cable plant, carrier, two-way radio, CCTV, data transmission, SCADA, public address, telephone.

Bay Area Rapid Transit District, Oakland, CA **1983 to 1986**
Communications Engineer

Field engineer during installation of replacement communications cable plant and replacement two-way radio system throughout District

Cyclotron Corporation, Berkeley, CA **1981 to 1983**
System Startup Engineer

Field engineer responsible for particle accelerator system final assembly and testing in factory and on customer premises.

Education:

Solano College, California
AA Degree Telecommunications, 1978

Accreditations:
Registered Electrical Engineer, California, 1994
Registered Electrical Engineer, Oregon, 1995
Registered Electrical Engineer, Washington State, 1997

Thomas A. Syfrett
Senior CAD Operator III
2009-present

Thomas is a computer-aided design and drafting (CADD) operator with PB. On the CRC project he supports DOT's management and design teams by providing sketches, exhibits and plans, for public involvement, web applications, design charts and workshops. He is experienced in creating final design packages for roadway, bridges, fiber optics, traffic, right-of-way, and bus rapid transit projects. Additionally he is experienced in graphic design work such as three-dimensional (3D modeling), animation, multimedia presentations and print layout. Thomas has experience with Microstation XM AutoCAD 2010, and CAD support packages such as Inroads, and Descarte. He is also familiar with Adobe Photoshop, Illustrator, Premiere, After Effects, Maxon Cinema 4D, Macromedia Dreamweaver and Flash.

Professional Experience:

Parsons Brinckerhoff Engineering - Portland, OR **7/2003 to Present**
Senior CAD Operator III

Create and maintain drawings in both Microstation and AutoCAD. Also create 3d presentation graphics for Eastside CSO project in Portland. I am currently working CRC project, primarily the Transit drawing set. I have worked on other projects as well but the CSO and CRC have been my main focus.

Clark College - Vancouver, WA **9/2007 to Present**
Adjunct Teacher

Teach Basic Microstation and Basic AutoCAD classes on Monday and Wednesday evenings as an adjunct instructor.

Kiewit Construction Network Services – Vancouver, WA **5/2000 to 9/2002**
CAD Operator

Maintain as-built drawings for the Level3 fiber project using Microstation SE.

Parsons Brinckerhoff Engineering – Vancouver, WA **3/1999 to 5/2000**
CAD Operator

Create and edit construction drawings for the Level3 fiber project using Microstation SE.

TCI Cable (Clark County System)– Vancouver, WA **9/1984 to 3/1999**
System Designer/CAD Operator

Design cable system electronics for all new build construction as well as redesign. Create and maintain all designed drawings using Microstation 5

Education:

Westwood College of Technology. Denver CO. (Online)
Associate's of Science in Graphic Design (July 2004)
4.0 GPA during all 7 quarters.

Megan Taylor
Environmental Planner
2007-present

Since 2007, Megan Taylor has worked as an environmental planner for local and state governments. Her experience includes transportation, historic preservation and architectural surveys, NEPA compliance and documentation, and communications and public involvement. As the author of multiple technical analyses supporting the Columbia River Crossing Draft EIS, Megan has coordinated with local and state agencies to evaluate and document the environmental and community impacts of project alternatives. In addition to authoring portions of the Columbia River Crossing Draft EIS, Megan also played a key role in the successful production and distribution of the document.

Professional Experience:

Parametrix, Portland, OR **5/07 to present**
Planner I

Outside of the Columbia River Crossing project, Megan has played small roles on a handful of other projects with Parametrix, including performing historic architectural basic surveys, reviewing NEPA documents, giving presentations to community groups, and assisting with public open houses and workshops.

Lower Columbia Fish Enhancement Group (LCFEG), Vancouver, WA **5/06 to 8/06**
Intern

Megan obtained an AmeriCorps internship with LCFEG performing in-stream restoration and monitoring studies. Megan also assisted with summer educational programs for elementary school students through the Columbia Springs Educational Center, and attended multiple public outreach events promoting aquatic habitat enhancement.

Education:

Lewis and Clark College, Portland, OR
B.A. Environmental Studies, 2007
Concentration in Landscape Biology

Daniel S. Teran
Transportation Engineer 1
2007-present

Professional Experience:

WSDOT, Vancouver, WA **July 2007 to Present**
Transportation Engineer 1

- Construction inspector for multiple projects, overseeing multiple construction tasks
- Work independently with limited supervision
- Lead designer for several Emergency Projects during winter of 2008 and 2009
- Lead inspector for Lieser Road Ramp Signal Project and several Emergency Projects
- Designer for the Salmon Creek Interchange Project, responsible for the design of drainage, ponds, retaining walls, noise walls, roadways, staging, and traffic control
- Plans review for multiple projects
- Work well with a diverse group of people, and in a team environment with multiple disciplines
- Proficient in the use of both Microstation and InRoads
- Other tasks performed include design documentation, creating project estimates, constructability reviews, project permitting, and contractor performance reviews

Oregon State University Facility Services
Corvallis, OR **May 2006 to June 2007**
Civil Engineering Internship

- Inspected road and bridge construction project
- Reviewed, organized and researched storm and sanitary pipe networks on campus
- Oversaw cleaning and videoing storm and sanitary lines performed by Roto Rooter
- Field verify campus storm network and outfalls into Oak Creek
- Research and problem solved building projects, including, sewer line and structural failure
- Research and review building drawings in the campus plan center
- Daily utility locates for contractor campus projects
- Used AutoCAD to create and update utility maps
- Worked in a fast pace environment with tasks changing daily

Education:

Oregon State University, Corvallis, OR
B.S. in Civil Engineering

Accreditations: E.I.T (2007)

Bradley Touchstone, A.I.A.
President/ Principal Bridge Architect
2003 – Present

Mr. Touchstone is the President and Principal Bridge Architect for Touchstone Architecture & Consulting, P.A, a Tallahassee, Florida, based architectural design firm providing Commercial and Residential Design in North Florida and Bridge Design worldwide.

Bradley C. Touchstone, AIA has dedicated his career to the development of signature bridge projects and as such, has expanded the role of architects on these projects both nationally and internationally.

Mr. Touchstone works extensively with the design teams and the community to ensure that the bridge design fits in harmony with the community and the environment. He has worked as the Bridge Architect for the development of design guidelines for repair and replacement of bridge projects world-wide.

The design of bridge projects requires a detailed understanding of how bridges work. There are very few architects that posses an understanding of bridges that surpasses Mr. Touchstone's. This acute knowledge of how bridges go together enables Mr. Touchstone to be a fully integrated part of the design team. The result is the infusion of aesthetic design from the very beginning of the project following a philosophy of *Low Cost and No Cost Aesthetic Enhancements*™.

In addition to bridge design, Mr. Touchstone has led many historic recordation and mitigation efforts for historic bridge structures. He understands what is required to navigate through the complicated requirements of Section 4(f) and Section 106 of the National Environmental Protection Act.

Professional Experience:

MoDOT Owner, Kansas City, Missouri **2007**
kcICON Bridge

LaDOT, St. Francisville, Louisiana **2004**
Audubon Bridge

MDOT, Biloxi, Mississippi **2007**
Biloxi US 90 Replacement

P3 (Public Private Partnership), Montreal, Canada **2008**
A-25 Completion

Road and Transit Authority, Abu Dhabi, U.A.E. **2006**
Saadiyat Bridge

CoDOT, Aspen, Colorado **2006**
Maroon Creek Bridge

Education:

University of the South
Course of Study- Mathematics

Mississippi State University
Bachelor of Architecture, 1993

Accreditations:
Registered Architect in Florida, Ohio, New York, Delaware, and Louisiana

Joel B. Tubbs, P.E.
Bridge Engineer, Landside Structures
2007-present

Joel is the lead designer for the landside transit bridges and landside highway bridges in Oregon. He is responsible for providing conceptual and preliminary designs for these structures, and coordinating between the CRC office and the external landside structures team.

Professional Experience:

Port of Vancouver, Vancouver, WA **5/2007 to 9/2007**
West Vancouver Freight Access – Schedule 1 Rail Design

Superstructure designer for two, double-track bridges designed and constructed according to BNSF standards and criteria for a new heavy-rail connection at the southeast end of the Port of Vancouver property.

South Corridor Constructors/TriMet, Portland, OR **12/2005 to 1/2007**
South Corridor, I-205 Segment Design-Build

Structures Task Lead responsible for the design management of a large, multi-state consultant structural design team for this light-rail project that included the design and construction of 10 new LRT bridges and over 200,000 square feet of new retaining walls, as well as modifications to an additional seven existing highway bridges.

ODOT/Multnomah County, Multnomah County, OR **7/2004 to 12/2005**
Multnomah Channel (Sauvie Island Road) Bridge Replacement

Designer and Engineer of Record for various structural elements for the 365-foot-long steel tied arch main span of the replacement bridge that provides the only vehicular access to Sauvie Island across the Multnomah Channel.

F.E. Ward Constructors/TriMet, Portland, OR **3/2001 to 10/2003**
Interstate MAX LRT Extension Line Section 10C (Expo Segment)

Bridge designer tasked with static and seismic analysis and design for the substructure, including rail-structure interaction effects, and construction engineering assistance and inspection for TriMet's 3,800-foot-long, 28-span VanPort bridge.

Education:

Washington State University, Pullman, WA
M.S. Civil Engineering, 2002
B.S. Civil Engineering, 1998

Accreditations:
Professional Engineer in Washington and Oregon

Robert D. Turton
Consultant Bridge Engineer
2008-present

Rob serves as the principal bridge engineer on the project providing technical leadership for the consultant team and consultation to the DOT management team for bridges and structures.

Professional Experience:

HDR Engineering, Inc., Phoenix, AZ **1997 to present**
Corporate Director for Bridges and Structures

Responsible for the development and quality of HDR's national and international bridge engineering program. Also serves as principal engineer on large and complex projects.

- Gravina Island Access, Ketchikan, AK – Principal Bridge Engineer for EIS
- Hoover Dam Bypass, Boulder City, NV – Delivery Manager and Principal Bridge Engineer for design and construction
- Reno Transportation Rail Access Corridor, Reno, NV – Structural Oversight Engineer for UPRR for design and construction
- San Francisco-Oakland Bay Bridge East Bay Crossing, Oakland, CA – Bridge Oversight Engineer for US Government

Cannon & Associates, Inc. Consulting Engineers, Tucson & Phoenix, AZ **1981 to 1997**
Chief Bridge Engineer

- Navajo Bridge, Grand Canyon National Park, AZ – Principal Bridge Engineer for design and construction
- Atlantic Boulevard Mixmaster, Commerce, CA – Principal Bridge Engineer for design
- Cedar Canyon Arch Bridge, Showlow, AZ – Consulting Engineer to the contractor for construction engineering services
- Cross-Taxiway Tango Underpass, Phoenix, AZ – Project Manager and Principal Bridge Engineer for design and construction.
- Kino Boulevard Overcrossing, Tucson, AZ – Project Manager and Principal Bridge Engineer for design and construction

Holben & Martin Consulting Structural Engineers, Tucson, AZ **1977 to 1981**
Project Structural Engineer

- Marriott Hotel, Albuquerque, NM – Structural Engineer for design
- Pishim Dam Batch Plant, Iran – Structural Engineer for design
- Tucson International Airport Expansion, Tucson, AZ – Structural Engineer for design and construction

Magma Copper Company, Tucson & San Manuel, AZ **1974 to 1977**
Design Engineer

Design Engineer for a vertically integrated copper producer with underground mine, railroad, mill, smelter, rod plant, and acid plant.

- SMARCO Railroad Trestle – Structural Engineer for design and construction
- 75-degree Underground Cross-Cut Station – Structural Engineer for design
- High Velocity Flue Support and Balloon Flue Conveyor System – Project Manager and Structural Engineer for design and construction

Education:

University of Arizona, Tucson, AZ
MS Civil Engineering (Structures), 1987
Boston University, Boston, MA
BS Aerospace Engineering, 1973

Accreditations:

PE – Colorado; CE – Alaska, California, Utah, Nevada; SE – Arizona, New Mexico, Utah

Don Wagner
Regional Administrator – WSDOT
1997 to Present

Responsible for leading, managing and delivery of the operations, maintenance and capital programs on the state transportation system within the seven southwest counties of Washington state. Provide executive leadership to the Columbia River Crossing project.

Professional Experience:

Oregon Department of Transportation **9/96 to 10/97**
Portland, OR
Regional Manager

Provide leadership and management oversight to the northwest region of the Oregon Department of Transportation. This region includes the Portland metropolitan area.

Oregon Department of Transportation **1992 to 1996**
Roseburg and Salem,
Region Manager

Provide leadership and management oversight to the southwest and mid-Willamette regions of the Oregon Department of Transportation.

Oregon Department of Transportation **1983 to 1992**
Salem, OR
Regional Project Development Engineer, Regional Maintenance Engineer, District Maintenance Manager, Regional Traffic Engineer.

Management positions for specific discipline functions within the regional framework of the Oregon Department of Transportation.

Oregon Department of Transportation **1973 to 1983**
Tillamook and Salem, OR
Field Construction Engineer, Headquarters Traffic Engineer

General engineering duties associated with field construction projects. Preformed engineering activities associated with general and specialized traffic engineering projects statewide within Oregon.
Job Description

Education:

Oregon State University, Corvallis, OR
BS, Civil Engineering (1974)

Accreditations:
PE Oregon and Washington

Dennis Walker
Facilities Maintenance Manager
9/2008-present

Consult the Columbia River Crossing project as a member of the C-TRAN planning team. Work includes passenger facilities design support from a repair and maintenance perspective.

Professional Experience:

C-TRAN, Vancouver, Washington **9/2008 to 1/2009**
Facilities Maintenance Manager

As the Facilities Maintenance Manager, I am responsible for the Facilities Maintenance and Custodial Services at the C-TRAN Administration, Operations, Maintenance, Fishers Landing, Stockford Village, Salmon Creek Park & Ride, Vancouver Mall and Evergreen Transit Center facilities. Other responsibilities include; Bus stop shelter installation and maintenance, Landscape Services and Project Management.

U.S. GSA, Portland, Oregon **9/2007 to 9/2008**
Facilities Operations Manager

Job Description; As the Facilities Operations Manager, I was responsible for the Facilities Maintenance and Custodial Services at the 911 Federal Building, 511 Federal Building, US Customs House, Troutdale Federal Warehouse and the Vancouver Federal Building. Other responsibilities included; Landscape Services and Project Management.

Hewlett-Packard, Vancouver WA. & Richmond, VA **8/1988 to 9/2007**

Facilities Manager - 9/2006 to 9/2007

As the Facilities Manager, I was responsible for the Facilities Maintenance, Project Management, IT, Custodial, Security, Food, Office and Landscape Services at the HP North American Product Completion and Distribution Center in Richmond, Virginia. The site consisted of 5 buildings with approximately 2.1 million sqft of high tech production and distribution operations running around the clock 365 days a year.

Facilities Program Manager - 8/1993 to 9/2006

As the Facilities Program Manager, I was responsible for the Facilities Maintenance, Custodial, Food, Office and Landscape Services at the HP Vancouver facility. The site consisted of 5 major buildings with approximately 800,000 sqft of R&D and Office Space on a 200 acre site.

Journey Technician - 8/1988 to 8/1993

As a Journeyman Technician, I was responsible for the PM and Repair services of the sites Buildings and Equipment in Vancouver, Washington. Areas of focus included; Mechanical, HVAC, Electrical and Life Safety/Security Systems. At that time the site consisted of two properties with 6 major buildings with approximately 1.2 million sqft of Production, R&D and Office Space on a 200 acre and 100 acre site.

Education:

City University, Vancouver, Washington
BA in Business Administration program – completed three plus years 1996, no diploma.

Clark College and Hewlett-Packard, Vancouver, Washington
4 year Industrial Mechanic apprenticeship program.

Kristen R. (Kris) Westersund, PLS, PE
DEA's CRC Survey Task Manager
2005-present

Mr. Westersund coordinates base mapping and right of way surveys on the CRC project for DEA, the project's prime consultant. He is licensed in Oregon and Washington as a professional surveyor (and civil engineer) so he can take professional responsibility for surveys in both states. Project surveys include control, right-of-way retracement, topographic surveys, laser scanning, utility mapping, survey monument perpetuation, parcel descriptions, and design details. Kris directs project staff, helps develop scopes and budgets, and checks progress and quality.

Professional Experience:

David Evans and Associates, Inc., Portland, OR **5/88 to present**
Senior Project Manager & Senior Associate

Mr. Westersund has particular expertise performing and managing surveys for large engineering projects. He has served in a range of management roles (e.g., task, project, contract manager) for clients including Western Federal Lands Highway Division of the Federal Highway Administration, US Forest Service, and the Bonneville Power Administration. His diverse experience includes serving as the responsible surveyor for many Washington County, Oregon, road projects and TriMet light rail projects. He has designed a road to summer homes at Lake of the Woods, Oregon, adjusted many least squares control networks, recovered stone section corners in Idaho's Owyhee desert, managed the construction staking of downtown Portland light rail improvements, and written legal descriptions for ODOT's headquarters right-of-way engineering unit. Mr. Westersund was honored as an outstanding senior project manager in DEA's Portland office for 2007 and 2008.

Cooper Consultants, Inc., Tigard, OR **10/83 to 6/84 and 6/85 to 9/88**
Survey Party Chief to Project Surveyor

Worked up from Party Chief staking the Westside Light Rail and other projects to licensed project surveyor.

Education:

Stanford University, Palo Alto, CA
B.S., Biological Sciences

Oregon State University, Corvallis, OR
B.S., Forest Management

Accreditations:

Professional Land Surveyor, Oregon (2164), 1985
Professional Land Surveyor, Idaho (5646), 1988
Certified Water Rights Examiner, Oregon (224), 1989
Professional Land Surveyor, Washington (33152), 1996
Professional Civil Engineer, Oregon (31977), 1998
Professional Civil Engineer, Washington (33152), 2000
Professional Land Surveyor, Montana (14728 LS) 2001
Professional Land Surveyor, Alaska (10607), 2002

Michael Albert Williams
Columbia River Crossing Business Manager
2008-present

Michael supports the Columbia River Crossing (CRC) Project as the Business Manager for the day-to-day management of the project office. Additional responsibilities include the quality assurance oversight for all the CRC financial reporting, project controls, transit planning and tolling development. He is also the CRC representative for the pedestrian and bicycle advisory committee (PBAC).

Professional Experience:

WSDOT, Vancouver WA **6/2007 to 9/2008**
Engineering Support Manager

Provides administration and leadership for the SW Region Engineering Support Office which all of the Region's construction program projects are developed and processed into contracts. Ensures that all SW Region design projects meet WSDOT Design Manual, local agency, state and federal requirements, laws, and guidelines. This also includes local agency and private development projects on the state highway network. Provides specialty group (Traffic Engineering, Cadastral Engineering, Hydraulics) contract documents for inclusion into all region project office PS&E projects. Provides regional assistance, guidance and training for all elements of project development to the project engineering offices design teams. Responsible for coordinating and conducting all SW Region's FHWA Stewardship Reviews, and associated responses. Responsible for the processing of Limited Access breaks and revisions on established Limited Access facilities.

WSDOT, Vancouver WA **1/2005 to 5/2007**
Manager, Planning and Program Management

As the Regional Manager for Planning and Program Management office my responsibilities required oversight of all regional planning and program management activities. This included interpreting and applying department programming goals and policies, and developing a region construction program that is cost effective and deliverable within financial and workforce constraints. This position ensures that the projects making up the program are accurately scoped and constructible. Additional responsibilities included continuous monitoring of the ongoing program to stay within financial and workforce allocations. Oversight for the strategic and tactical implementation and application of policies for Southwest Region planning. Developed regional and local policies on bi-state, regional, and local board and committees. Develop state policy on WDSOT statewide task forces. Interpret state and federal policy to local jurisdictions, local development community, and citizens. Represented WSDOT on bi-state task forces.

Education:

Oregon Institute of Technology, Klamath Falls, OR
B.S., Civil Engineering Technology, 1990

Everett Community College, Everett, WA
A.T.A., Civil Engineering Technology, 1983

Central Washington University, Ellensburg, WA
Construction Management, 34 credits, 1979

Accreditations:

Registered Professional Engineer - Oregon #48119PE & Washington #36353
Management Training Program - Colorado State University 1995

Steven D. Witter
Transit Team Manager, TriMet
Capital Projects and Facilities Division
2008 – Present

Responsible for management of a CRC Transit Team including prime consultants and multiple sub-consultants to meet all federal and agency program and budget requirements for the CRC Light rail project connecting Portland Oregon and Vancouver Washington. Specific duties include coordination of design teams to meet FTA approvals throughout the project, including jurisdictional requirements, coordination of jurisdiction review and comment on interim and final design submittals. Reports to CRC Project director.

Professional Experience:

TriMet, Portland, OR

2007 to 2008

Project Director WES Commuter Rail

Oversaw the successful completion of commuter rail project, a 14.7 mile line connecting four cities with five stations. Responsibilities include overseeing construction field office team, design team, real property acquisitions and permit approvals. Responsible for compliance with all local permitting requirements including ODOT Road and Rail divisions. Maintained relationships with all four city administrations and negotiated challenging relationships with affected property owners and neighborhoods.

Design Manager WES Commuter Rail **2005 to 2007**

Responsible for managing prime consultant and sub-consultants for all aspects of the civil engineering, architecture, landscape architecture, mechanical and electrical engineering . Managed the combined design contracts totaling $4 million dollars. Working closely with the Cities of Tigard and Tualatin in integration of station design betterments to meet their goals for developing regional town centers.

Designer Interstate-205 Light Rail Preliminary Engineering **2004 to 2005**

Architectural design lead for stations, operations buildings, 500 space transit center parking structure. Developed Baseline Project Requirements for Design Build Contract Negotiations. Coordinated Station site design with various engineering disciplines, worked with local jurisdictions, neighborhood groups and development agencies. Coordinate operational requirements for adjacent Transit Oriented Developments.

Engineer, Design Development **2001 to 2004**

Office Engineer - Interstate Max, responsible for administration of all contract documentation with an emphasis on the cost control and change order management aspects of the Overhead Electrification, Signals and Communications, and Central Control Software contracts. Engineer for Interstate Max Signage and Graphic and Transit Tracker next train information display installation projects. Coordinated design and construction activity with Contractor, Tri-Met Operations and Maintenance of Way, Jurisdictions, and General Public. Prepared Contract Specifications and Documents.

Education:

University of Oregon, Eugene, OR
Master of Architecture – 1996

Portland State University, Portland, OR
BS Fine Art 1990

Robert J. Wood, ASLA
Associate Partner/Landscape Architecture and Urban Design
2006-present

Professional Experience:

Zimmer Gunsul Frasca Architects LLP **07/2002 to present**
Associate Partner

Currently providing urban design, planning and landscape services in concert with ZGF architectural and infrastructure projects. Transportation projects include CenterLine Light Rail Transit System, Orange County, California; design and engineering guidelines for DART Transit, Dallas TX. ZGF Institutional projects include Legacy Emanuel Health Center, Children's Hospital, Portland, Oregon; Planning and Landscape Architecture for the Peace Garden and Ford Memorial Grove, California State University Fresno, CA.

Peter Walker and Partners, Berkeley, CA. **05/1999 to 05/2002**
Project Manager

Project oversight and project management for landscape architectural projects including the San Jose International Airport Master Plan, San Jose, CA; Chemistry and Biology Complex, and the Clark Center Bio-med Center, Stanford University, CA; Phase 2, UCSF Mission Bay Campus,, San Francisco, CA

Bechtel Civil, San Francisco, CA **09/1983 to 03/1999**
Senior Landscape Architecture and Urban Design

Experience emphasizing the potential of infrastructure projects in community development. Projects include Khalid International Airport, Saudi Arabia; Bay Area Rapid Transit (BART) Master Plan and Conceptual Design; Dublin/Pleasanton Extension, updating BART's Site and Landscape Design Guidelines. Embarcadero Muni Metro, Roadway Light Rail and Promenade, San Francisco, CA. Commercial and entertainment projects include Hakkehima Festival Market Project, Yokohama, Japan, New Town Moti-Khavdi Refinery Complex, Jamnagar, India, Pest Danube Shore Mixed-Use Urban Waterfront Development, Budapest, Hungary and Dubai International Airport, New World Theme Park and Festival Market Place Dubai, United Arab Emirates

The SWA Group, Sausalito, CA **10/1980 to 06/1983**
Landscape Architect

Landscape, urban design and construction documents for projects including Stanford Park Resort Hotel, Palo Alto, CA and Barney Allis Plaza, Kansas City, MO

Education:

Rhode Island School of Design 1976
Bachelor of Fine Arts/Architecture

Rhode Island School of Design 1977
Bachelor of Landscape Architecture

Accreditations:
Member, American Society of Landscape Architects

Debra Wright
C-Tran, Operations Chief
2005-present

Debra provides critical direction and oversight to department managers and plans, organizes, coordinates, and manages the agency's operations in conformance with C-TRAN's strategic plan and budgeted resources. Scope of responsibility includes service planning, training and safety programs, field and security operations, customer service, fixed route, innovative service and ADA paratransit operations. In this capacity, Debra directs the utilization of equipment and resources to ensure efficient, cost-effective, and customer-oriented delivery of transit services to the community.

Professional Experience:

C-Tran, Vancouver, Washington — 1993 to 2005
Fixed Route Services Manager

• Managed operations division including 27 fixed and innovative service routes throughout Clark County and commuter routes between Vancouver and Portland, Oregon; developed and administered operating budget and capital spending for a division of 195 employees (180 coach operators, 15 supervisors and staff).
• Member of team responsible for negotiating labor agreements with Amalgamated Transit Union, Division 757.
• Successfully proposed and implemented cost cutting strategies after state initiative I-695 eliminated 40% of the agency's annual funding.
• Participated in service planning and development, responsible for implementation of service changes and special events service.

Standard & Poor's Compustat Services, Inc., Englewood, Colorado — 1976 to 1987

Director, Database Operations, 1984 – 1987
• Developed and administered operating budget and capital spending for 125 employee department
• Directed installation of a terminal data entry system; achieved a 17% staffing reduction and $600,000 annual savings
• Researched and developed business plans for product enhancements, new product development and joint ventures
• Conducted facilities space planning and supplier evaluations
• Successfully implemented department-wide reorganization

Manager, Non-industrial Database Services (Public Utilities and Banking Institutions), 1981 – 1984
• Researched, designed and implemented new Telecommunications database
• Devised staff development and mentorship program resulting in advanced placement for 35% of staff
• Initiated new product feasibility study involving client research, cost/benefit and competitive analyses

Assistant Manager, Customer Support, 1980 – 1981
• Researched client and vendor questions, negotiated solutions regarding financial data applications and technical documentation
• Recommended appropriate financial applications and report presentations to licensed data distributors; performed software acceptance testing
• Responsible for contract administration

Education:

University of Colorado
M.B.A. with emphasis in finance, 1992

University of Colorado
B.A., History, 1974

Accreditations:
Washington State Public Transportation Roadeo Judge, 2001 – 2008
Member of Washington State Transit Association, Operations Subcommittee, 1994 – 2008
C-TRAN Roadeo Judge, 1994 – 2008; Washington State Roadeo Judge, 2006 – 2008
Wall of Fame Honoree, I-5 Bridge Closure Team, Washington State DOT, 1998

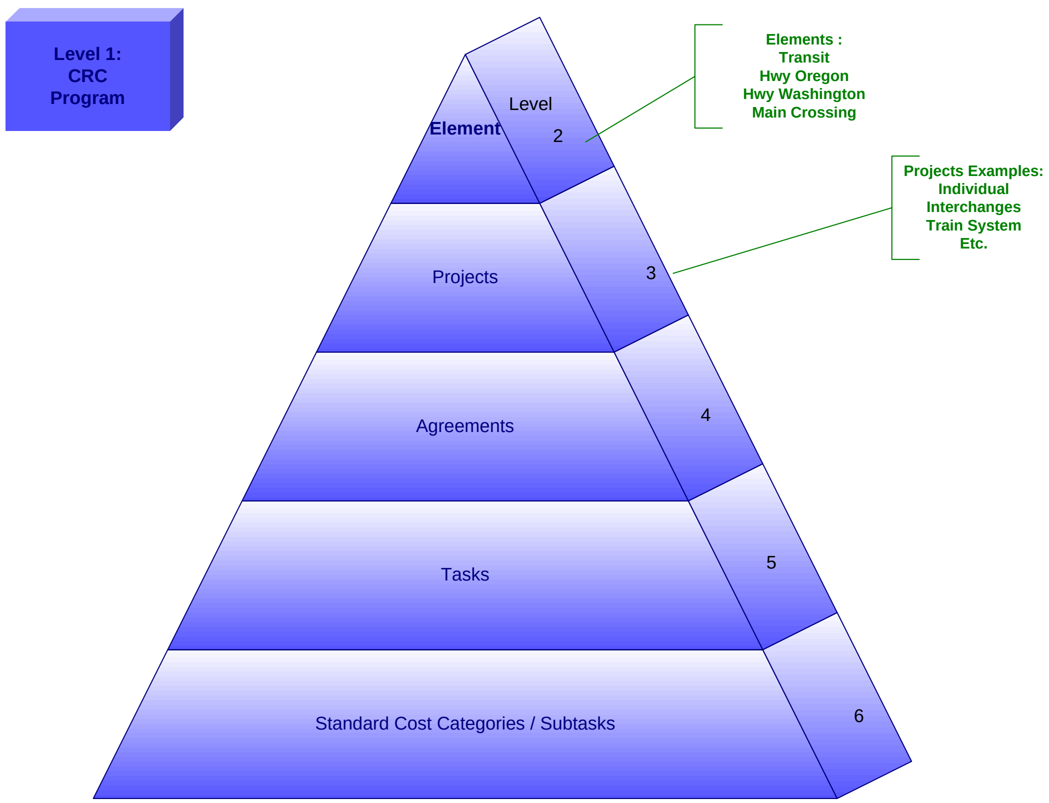
Appendix B

Work Breakdown Structure Hierarchy

This page left blank intentionally.

Proposed Level 1, 2 and 3 Hierarchy WBS

Program Level 1:			**CRC**		
Element Level 2:	**EIS**	**Transit**	**Hwy Oregon**	**Hwy Washington**	**Main River Crossing**
Project Level 3:	**EIS**	Support Facilities	Hayden Island Interchange - Or	29th Street & 33rd Street Bridges	NB - Hwy Or
		Transit Expo to State Line	Mainline - Or	Collector - Distributor Roads - Wa	NB - Hwy Wa
		Transit State Line to Clark College	Marine Drive Interchange	Evergreen Blvd Bridge	SB- Hwy OR
				Fourth Plain Interchange - Wa	SB- Hwy Wa
				Mainline - Wa	Demo of Existing Bridges
				Mill Plain Interchange - Wa	
				SR-14 Interchange - Wa	
				SR-500 Interchange - Wa	



Level 7 = Consultant, Entity or Owner Note: Scalable to include additional levels

This page left blank intentionally.

Code	Description
DOJSAAGA	DOJ Benefiting Agency SAAG Agreement - Nossaman
GCA4723O	ODOT WSDOt GCA 4723 / ODOT No. 22946
GCA47670	RTC GCA 4767
GCA47930	TriMet GCA 4793
GCA48110	City of Vancouver GCA 4811
GCA4842-	City of Portland GCA 4842
GCA4843-	METRO GCA 4843
GCA4844-	C-Tran GCA 4844
GCA5244-	CALTRANS GCA 5244
GCA5271-	Sound Transit VE Agreement
GCA5420-	GCA 5420 Confederated Tribes of Grand Ronde
GCA5586-	City of Portland (PDOT) GCA 5586
GCA5622A	GCA 5622 Task AA - Cowlitz Indian Tribe
GCA5647-	RTC GCA 5647
GCA5667-	TriMet GCA 5667
GCA5736-	NPS GCA 5736 Base Agreement
GCA5736A	NPS GCA 5736 Task AA
GCA5736B	NPS GCA 5736 Task AB
GCA5744-	METRO GCA 5744
GCA5757-	City of Vancouver GCA 5757
GCA5972-	City of Vancouver GCA 5972 - Design Competition
GCA6007-	City of Vancouver GCA 6007
GCA6304-	CTran GCA 6304
HQTK4-07	WSDOt HQ Task 4-07 : Crux Subsurface Inc.
O2347261	ODOT 23472 WOC 6 Amend 1 - CH2MHIll IAMP Hayden Island & Marine Drive
O2382341	ODOT 23823 WOC 4 - Lou Schwab ROW Acquisition Coordination
ODOTExpe	DOT Labor and Direct Expense - ODOT
ODReGM39	ODOT Maintenance Agreement (1968) GM00395 - Received Nov-05
Peer1008	Peer Review Panel Review - 2008
Peer1108	Peer Review Panel November 20 - 21st 2008
Proposed	TBD
RODBudge	Project Budget Established by Record of Decision
TribalAg	Tribal Agreements
WSDOTExp	DOT Labor and Direct Expense - WSDOT
Y10017BG	National Constructors Group - Y10017 Task Order BG
Y10018AN	Y-10018 Task AN William Ott
Y10022BC	Y10022 BC Parsons CEVP CRA
Y10022BG	Y10022 BG Parsons CEVP CRA
Y10025AB	HDR - Value Engineering and Risk Assessment Y10025 Task AB
Y10025AC	HDR Y10025 - Cost Benefit
Y10026AB	HDR Y10026 Task AB - Risk Assessment
Y10026AE	HDR Y10026 Task AE - CEVP February 2009
Y10063DO	DOJ - Nossaman Agreement
Y10218AB	Shannon & Wilson Y10218 Task Order AB
Y10438AA	HDR - Y10438 AA Pre Task VE Study
Y10438AB	HDR - Y10438 AB Constructability Review Value Engineering
Y8074AH0	Parsons Brinckerhoff Y8074-AH
Y8289AA0	CH2MHill Y8289-AA
Y8417AS0	Wongdoody Y8417-AS
Y8671AA0	HNTB Contract Y8671 Task Order AA
Y8889AP0	HDR-HLB Decision Economics Y8889 Task Order AP
Y8891BU0	Parsons Transportation Group Y8891 Task Order BU
Y8897BH0	National Constructors Group Y8897 Task Order BH
Y9245000	David Evans & Associates Base Contract
Y9245AA0	David Evans & Associates Y9245 Task Order AA
Y9245AB0	David Evans & Associates Y9245 Task Order AB
Y9245AC0	David Evans & Associates Y9245 Task Order AC
Y9245AD0	David Evans & Associates Y9245 Task Order AD
Y9245AE0	David Evans & Associates Y9245 Task Order AE
Y9245AF0	David Evans & Associates Y9245 Task Order AF
Y9267000	The Underhill Company, LLC Y9267
Y9388AE_	John Reilly Associates International, LTD.
Y9758 AL	Y9758 Task AL T.Y. Lin International
Y9796AD0	Solutions@Work
ZRisk001	Risk Item : Lid Design Competition Vancouver

Code	Description
2003ORAp	2003 Consilidated Appropriations Oregon
2007Agre	April 2007 - Tindall Agreement
GCA 4723	ODOT WSDOT Reimbursement Agreement
OR 337	SAFETEA-LU 2005-2009 ODOT No. 337
OR 2458	SAFETEA-LU 2005-2009 ODOT No. 2458
OR 3058	2006 Federal Earmark - ODOT
OR 07IMD	FY 2007 Interstate Maintenace Discretionary Awards
OR 08IMD	FY 2008 Interstate Maintenance Discretionary Awards
OR 09IMD	FY 2009 Interstate Maintenance Discretionary Awards - Or
OR08 IMD	2008 Federal Earmark - ODOT (IMD)
OTIAFund	OTIA Funds
TrPa0507	2005 - 2007 Transportation Partnership Funds
TrPa0709	2007 - 2009 Transportation Partnership Funds
TrPa0911	2009 - 2011 Transportation Partnership Funds
Unfunded	Budget Unfunded
WA 1423	SAFETEA-LU 2005-2009 WSDOT No. 1423
WA 5114	SAFETEA-LU 2005-2009 WSDOT No. 5114
WA STIP	2004 Federal Earmark - WSDOT
WA 07IMD	FY 2007 Interstate Maintenance Discretionary Awards
WA 09IMD	FY 2009 Interstate Maintenance Discretionary Awards - Wa
WA 10911	2005 Federal Earmark - WSDOT
WSDOT St	WSDOT State Funds

Level 5: Tasks
Current WBS Listing

CodeID	Description
00	N/A - Not Task Specific
01	Project Management
02	Project Controls
03	Financial Structures
04	Communications
05	Transportation Planning
06	Environmental
07	Transit Engineering
08	Design Engineering
09	Interdiciplinary Coordination
20	DEIS - Phase I Continued
21	DEIS - Phase II Early Starts
31	Sponsor Agency Staff
32	Consultant Staff
33	Environmental Analysis
34	Permits
35	Survey
36	Commissioning
37	Testing
38	Insurance
39	Design
40	Construction
41	Owner's Contingency
42	Miscellaneous
MP	MPD Scoping Process
OR	ODOT Labor and Expense
RW	Right of Way
WS	WSDOT Labor and Expense
IG	Intergovernmental Agreement
MP	MPD Scoping Process
OR	ODOT Labor and Expense
RW	Right of Way
TA	Tribal Activiities
WS	WSDOT Labor and Expense

CodeID	Description
ODOTR	ODOT Reimbursements
10.01	Gwy: At-grade exlusive right-of-way
10.02	Gwy: At-grade semi-exlusive (allows cross-traffic)
10.03	Gwy: At-grade in mixed traffic
10.04	Gwy: Aerial structure
10.05	Gwy: Built-up fill
10.06	Gwy: Underground cut & cover
10.07	Gwy: Underground tunnel
10.08	Gwy: Retained cut or fill
10.09	Track: Direct fixation
10.10	Track: Embedded
10.11	Track: Ballasted
10.12	Track: Special (switches, turnouts)
10.13	Track: Vibration and noise dampening
20.01	At-grade station, stop, shelter, mall, terminal, platform
20.02	Aerial station, stop, shelter, mall, terminal, platform
20.03	Underground station, stop, shelter, mall, terminal, platform
20.04	Other stations, landings, terminals: Intermodal, ferry, trolley, etc.
20.05	Joint development
20.06	Automobile parking multi-story structure
20.07	Elevators, escalators
30.01	Administration Building: Office, sales, storage, revenue counting
30.02	Light Maintenance Facility
30.03	Heavy Maintenance Facility
30.04	Storage or Maintenance of Way Building
30.05	Yard and Yard Track
40.01	Demolition, Clearing, Earthwork
40.02	Site Utilities, Utility Relocation
40.03	Haz. mat'l, contam'd soil removal/mitigation, ground water treatments
40.04	Envl mitigation, e.g. wetlands, historic/archeologic, parks
40.05	Site structures including retaining walls, sound walls
40.06	Ped / bike access and accommodation, landscaping
40.07	Auto, bus, van accessways including roads, parking lots
40.08	Temp Facilities and other indirect costs during construction
50.01	Train control and signals
50.02	Traffic signals and crossing protection
50.03	Traction power supply: substations
50.04	Traction power distribution: catenary and third rail
50.05	Communications
50.06	Fare collection system and equipment
50.07	Central Control
60.01	Purchase or lease of real estate
60.02	Relocation of existing households and businesses
70.01	Light Rail
70.02	Heavy Rail
70.03	Commuter Rail
70.04	Bus
70.05	Other
70.06	Non-revenue vehicles
70.07	Spare parts
80.01	Preliminary Engineering
80.02	Final Design
80.03	Project Management for Design and Construction
80.04	Construction Administration & Management
80.05	Professional Liability and other Non-Construction Insurance
80.06	Legal; Permits; Review Fees by other agencies, cities, etc.
80.07	Surveys, Testing, Investigation, Inspection
80.08	Start up
90.00	Contingency - Unallocated
100.0	Finance Charges
00TBD	TBD
Pavem	Conceptual - Pavement
Earth	Conceptual - Earthwork
Bridg	Conceptual - Bridges
Other	Conceptual -Other

CodeID	Description
Walls	Conceptual- Walls
10.0a	Conceptual - Transit Guideway
10.0b	Conceptual - Transit Track
20.00	Conceptual Estimate - Transit Stations
40.00	Conceptual Estimate - Transit Sitework
50.00	Conceptual - Transit Systems
40.R1	ROW Demolition
40.s2	Utilities Stormwater Treatment
40.r2	Utilities Relocation
40.E8	Conceptual - Erosion and Sediment Control
40.T8	Traffic Control and Construction Staging
40.M8	Mobilization
BikPe	Bike / Pedestrian Walkway
0Demo	Bridge Demolition
Super	Superstructure
Subst	Marine Foundation
40.A6	Art
ITS__	ITS: Ramp Meters, Fiber-optic Cable, Cameras Etc.
Light	Lighting
LandF	Land Foundation
Tolli	Toll Collection
90.10	Contingency - Professional Services
90.20	Contingency - Construction and Purchase
90.30	Contingency - ROW
90.40	Contingency - Contingency
0000UF	Budget Unfunded
NotApp	Does Not Apply
Rental	DEA Rental Agreement
AB0101	AB 1.1 Project Management and QC
AB0102	AB 1.2 Joint Office Support
AB0200	AB 2.0 Project Controls
AB0300	AB 3.0 Financial Structures
AB0400	AB 4.0 Communications
AB0401	AB 4.1 Communications General Services
AB0501	AB 5.1 Travel Demand Modeling
AB0502	AB 5.2 Transportation Planning Coordination
AB0503	AB 5.3 Freight Working Group Development
AB0600	AB 6.0 Environmental
AB0500	AB 5.0 Transportation Planning
AB0601	AB 6.1 Purpose and Need
AB0602	AB 6.2 NEPA Scoping Phase
AB0603	AB 6.3 Alternatives Development
AB0604	AB 6.4 Technical Studies
AB0700	AB 7.0 Transit Planning and Engineering
AB0701	AB 7.1 Existing Information Evaluation
AB0702	AB 7.2 Initial Alternatives Development
AB0800	AB 8.0 Design Engineering
AB0801	AB 8.1 Existing Information Evaluation
AB0802	AB 8.2 Initial Alternatives Development
AC0100	AC 1.0 Project Management and QC
AC0200	AC 2.0 Project Controls - Task AC
AC0300	AC 3.0 Financial Structures
AC0400	AC 4.0 Communications
AC0500	AC 5.0 Transportation Planning
AC0600	AC 6.0 Environmental
AC0700	AC 7.0 Transit Planning / Engineering
AC0800	AC 8.0 Highway Planning / Engineering
AC0900	AC 9.0 Interdisciplinary Coordination, Documentation and Strategies
AC01MU	AC 4% Markup on Subconsultants
00CEVP	CEVP
AD0101	AD 1.1 Project Team Oversight and Coordination
AD0102	AD 1.2 Project and Agency Coordination
AD0103	AD 1.3 Intergovernmental Agreements
AD0104	AD 1.4 Interdisciplinary Coordination and Documentation
AD0105	AD 1.5 Establish Expert Review Panel

CodeID	Description
AD0201	AD 2.1 Project Controls Team Project Mgt.
AD0202	AD 2.2 Agency and Public Outreach
AD0203	AD 2.3 Schedule Management and Control
AD0204	AD 2.4 Budget Management
AD0205	AD 2.5 Document Control Management
AD0206	AD 2.6 Monthly Invoice and Progress Report
AD0207	AD 2.7 Project Management Plan and Updates
AD0208	AD 2.8 Prolog Database Management Support
AD0209	AD 2.9 QA / QC Oversight
AD0210	AD 2.10 Project Control Support for Other Disciplines
AD0301	AD 3.1 Financial Team Project Management and QC
AD0302	AD 3.2 Agency and Public Outreach
AD0303	AD 3.3 Discussion/Resolution of Institutional and Policy Issues
AD0304	AD 3.4 Tolling: Capital, O&M Costs, Revenue Projections, and Financial Capacity
AD0305	AD 3.5 Financial Analysis and Finance Plan Development
AD0306	AD 3.6 Cost Benefit Analysis
AD0401	AD 4.1 Communications Team Project Mgt and QC
AD0402	AD 4.2 Group Support
AD0403	AD 4.3 Communications Materials
AD0404	AD 4.4 Communications Tracking and Response
AD0405	AD 4.5 Public Outreach and Engagement
AD0406	AD 4.6 Media Support
AD0407	AD 4.7 Market Research
AD0408	AD 4.8 Project Advertising
AD0501	AD 5.1 Transportation Team Project Mgt. QC
AD0502	AD 5.2 Agency and Public Outreach Support
AD0503	AD 5.3 Alternatives Design Refinement
AD0504	AD 5.4 Traffic Methods and Data Report, Traffic Data Plan and Safety Analysis
AD0505	AD 5.5 Regional Travel Demand Modeling
AD0506	AD 5.6 Transportation Analysis
AD0507	AD 5.7 Interchange Justification Reports and Interchange Area Management Plans
AD0508	AD 5.8 Special Technical Studies
AD0509	AD 5.9 Alternatives Evaluation and DEIS Preparation
AD0510	AD 5.10 Traffic Support for Other Disciplines
AD0601	AD 6.1 Environmental Team Project Management and Quality Control
AD0602	AD 6.2 NEPA Public Involvement Support
AD0603	AD 6.3 Engineering, Traffic and Transit Team Support
AD0604	AD 6.4 Regulatory Agency Coordination and Compliance
AD0605	AD 6.5 Cultural and Related Resources Coordination
AD0606	AD 6.6 Alternatives Evaluation
AD0607	AD 6.7 DEIS Framework
AD0608	AD 6.8 Technical Reports
AD0609	AD 6.9 Technical Reports and DEIS Support
AD0610	AD 6.10 Draft Environmental Impact Statement
AD0611	AD 6.11 Public Comment Period and LPA Adoption
AD0612	AD 6.12 Geographic Information Systems Support
AD0613	AD 6.13 Sustainability Plan
AD0701	AD 7.1 Transit Team Project Management and Quality Control
AD0702	AD 7.2 Transit Agency and Public Outreach Support
AD0703	AD 7.3 Transit Alternatives Design Refinement
AD0704	AD 7.4 FTA New Starts Projects and Coordination
AD0705	AD 7.5 Transit Service Planning and Analysis
AD0706	AD 7.6 Transit Conceptual Engineering (CE)
AD0707	AD 7.7 Transit Preliminary Engineering
AD0708	AD 7.8 Transit Alternatives Evaluation and DEIS Preparation
AD0709	AD 7.9 Transit Support for Other Disciplines
AD0801	AD 8.1 Design Team Project Management and Quality Control
AD0802	AD 8.2 Agency and Public Outreach Support
AD0803	AD 8.3 Engineering Alternatives Design Refinement
AD0804	AD 8.4 Supplemental Surveying and Right-of-Way Services
AD0805	AD 8.5 Conceptual Civil Engineering
AD0806	AD 8.6 Conceptual Structural Engineering
AD0807	AD 8.7 Preliminary Geotechnical Engineering
AD0808	AD 8.8 Hydraulics Analysis
AD0809	AD 8.9 Alternative Cost Estimating

CodeID	Description
AD0810	AD 8.10 Aesthetics for Structures and Landslides
AD0811	AD 8.11 CEVP/Value Engineering
AD0812	AD 8.12 Design Support for Other Disciplines
AD0901	AD 9.1 Implementation Project Management and Quality Control
AD0902	AD 9.2 Research Alternative Delivery Systems
AD0903	AD 9.3 Conduct Integrated Design/Constructability Workshop
AD0904	AD 9.4 Draft Implementation Plan
AD0307	AD 3.7 On-Call Technical Coordination Services
AD01MU	4 % Markup on Subs
GC5201	GCA 5201 - Nez Perce Tribe
HisSem	History Seminar
HDRAC1	HDR - Task AC Cost Benefit
AF0101	AF 1.1 Project Team Oversight and Coordination
AF0102	AF 1.2 Project and Agency Coordination Meetings
AF0103	AF 1.3 Interdisciplinary Coordination and Documentation
AF0104	AF 1.4 Expert Review Panels
AF0201	AF 2.1 Project Controls Team Project Mgt.
AF0202	AF 2.2 Schedule Management and Control
AF0203	AF 2.3 Budget Management
AF0204	AF 2.4 Document Control Management
AF0205	AF 2.5 Monthly Invoice and Progress Reports
AF0206	AF 2.6 Project Management Plan and Updates
AF0207	AF 2.7 Prolog Database Management Support
AF0301	AF 3.1 Financial Team Project Mgt and Q.C.
AF0302	AF 3.2 Agency and Public Outreach Support
AF0303	AF 3.3 Tolling Analysis
AF0304	AF 3.4 Refined Analyses of Financial Plan Issues
AF0305	AF 3.5 Resolve Instit., Intergov, Statutory & Regulatory Issues
AF0401	AF 4.1 Communciations Management
AF0402	AF 4.2 Group Support and Project Meetings
AF0403	AF 4.3 Materials
AF0404	AF 4.4 Tracking and Responses
AF0405	AF 4.5 Outreach and Engagement
AF0406	AF 4.6 Media
AF0407	AF 4.7 Market Research
AF0501	AF 5.1 Transp. Team Project Mgt. and Q.C.
AF0502	AF 5.2 Agency and Public Outreach Support
AF0503	AF 5.3 Faciliatio of Freight Working Group
AF0504	AF 5.4 Facilitation of Freight Working Group
AF0505	AF 5.5 Year 2035 Traffic Forecasts and Traffic Analysis
AF0506	AF 5.6 Opening Year Traffic Forecasts and Traffic Analysis
AF0507	AF 5.7 Tolling Anaysis Support
AF0508	AF 5.8 Traffic Analysis of Alternative Configurations
AF0509	AF 5.9 Traffic Operations Analysis of Alternative HCT Alignments and Park N Rides
AF0510	AF 5.10 Interchange Access Modification Request (IAMR) Final Report
AF0511	AF 5.11 IAMP Coordination
AF0512	AF 5.12 Freeway and Interchange Area Design Support
AF0513	AF 5.13 Local Street Design Support
AF0514	AF 5.14 Pedestrian and Bicycle Facility Design Support
AF0515	AF 5.15 Construction Staging Support
AF0516	AF 5.16 Special Technical Studies
AF0517	AF 5.17 Traffic Support for Other Disciplines
AF0518	FEIS Preparation
AF0601	AF 6.1 Environmental Task Managment
AF0602	AF 6.2 NEPA Public Involvement Support
AF0603	AF 6.3 Engineering, Traffic and Transit Team Support
AF0604	AF 6.4 Regulatory Agency Coordination
AF0605	AF 6.5 Cultural and Related Resources Coordination
AF0606	AF 6.6 Technical Reports by Parametrix
AF0607	AF 6.7 Air Quality, Noise, Economics and Archaeological Technical Reports
AF0608	AF 6.8 Final Section 4(f) Evaluation
AF0609	AF 6.9 Final Environmental Impact Statement
AF0610	AF 6.10 Record of Decision
AF0611	AF 6.11 Geographic Information Systems Support
AF0612	AF 6.12 Mitigation Plan

CodeID	Description
AF0613	AF 6.13 Permitting Support
AF0614	AF 6.14 Sustainability Plan
AF0701	AF 7.1 Transit Team Mgt and QC
AF0702	AF 7.2 Agency and Public Outreach Transit Support
AF0703	AF 7.3 Advanced Conceptual Engineering
AF0704	AF 7.4 FTA New Starts Products and Coordination
AF0705	AF 7.5 Transit Service Planning and Analysis
AF0706	AF 7.6 Transit Preliminary Civil Engineering
AF0707	AF 7.7 Transit Statin and Urban Design / Architecture
AF0708	AF 7.8 Transit Systems Engineering
AF0709	AF 7.9 Transit Structural Design
AF0710	AF 7.10 Preliminary Engineering Special Studies / Reviews
AF0711	AF 7.11 Transit Preliminary Engineering Coordination
AF0712	AF 7.12 Support FEIS Preparation
AF0713	AF 7.13 Support for Other CRC Disciplines
AF0714	AF 7.14 Coordination for Planning, Permitting, and Zoning Constraints
AF0715	AF 7.15 Coordination with Cities, Property-Owners, and Stakeholders to Implement Station ARea Recommendations
AF0801	AF 8.1 Design Team Project Mgt and QC
AF0802	AF 8.2 Supplemental Surveying and ROW Services
AF0803	AF 8.3 Civil Design
AF0804	AF 8.4 Structural Design
AF0805	AF 8.5 Cost Estimating
AF0806	AF 8.6 Aesthetics for Structures and Landsides
AF0807	AF 8.7 CEVP / Value Engineering
AF0808	AF 8.8 Design Support for Other Disciplines
AF0809	AF 8.9 Geo. Eng. Studies for the CRC Bridge and Seismic Ground Motion Eval.
AF0810	AF 8.10 Geo. Explor. for Tier 1 Phase of Or. lanside Bridge and Structures
AF0901	AF 9.1 Implementation Project Mgt and QC
AF0902	AF 9.2 Complete Research of Alternative Delivery Systems
AF0903	AF 9.3 Conduct Integrated Constructability Workshop
AF0904	AF 9.4 Update and Revise Draft Implementation Plan
AF01MU	AF 1.1 Expense 4% Markup on Subs
PPR TM	Peer Panel Review - Traffic Modeling Validation
OralHi	Tribal Oral History
Y10403	Y-10403 Don Ivy Tribal Agency Consultation Meeting
IGA___	Intergovernmental Agreements and Tribes
000100	Project Management - IGA
000200	Project Controls - IGA
000600	Environmental - IGA
000700	Transit - IGA
000900	Interdisciplinary - IGA
000300	Financial Structures - IGA
000400	Communications - IGA
000500	Transportation Planning - IGA
000800	Design Engineering - IGA
Expens	Direct Expense
Labor_	Labor
NA----	Non Scope Specific
0000UF	Budget Unfunded
TraPar	Transportation Partnership Funds
0S0509	SAFEATEA-LU 2005-2009
FE2005	2005 Federal Earmark
FE2004	2004 Federal Earmark
ODOTRe	ODOT Reimbursements
StaNon	WSDOT State Non Participating Funds
FE2006	2006 Federal Earmark
FE2003	2003 Federal Earmark
407Agr	Doug Tindall Agreement - April 2007
FE2008	2008 Federal Earmark
FE2007	2007 Federal Earmark
FE2009	2009 Federal Earmark

CodeID	Description
000TBD	Non Specific TBD
00CH2M	CH2M Hill, Inc.
0Sound	Sounds Transit
0Tribe	Tribal Individual - Specific Unknown
ARC___	Atlanta Regional Commission
CALTra	California Department of Transportation
CamSys	Cambridge Systematics
CarBur	Carter & Burgess, Inc
CFM---	Conkling Fiskum
Chinoo	Chinook Tribe
COP---	City of Portland
COV---	City of Vancouver
Cowlit	Cowlitz Indian Tribe
CruxSu	Crux Subsurface Inc.
C-TRAN	C-TRAN
CZE---	Cooper Zietz and Engineers, Inc.
DavGre	David Grey
DavHib	Davis, Hibbitts, Midghall, Inc.
DavLan	Davis Langdon
DEA---	David Evans Associates, Inc.
DonIvy	Don Ivy
EarDyn	Earth Dynamics
Enviro	EnviroIssues
Federa	Federal Earmarks
FEI___	Foundaton Engineering, Inc.
GraRon	Grand Ronde Tribe
Greenf	Mark J. Greenfield
HDREng	HDR Engineering, Inc.
HDRHLB	HDR-HLB Decision Economics
Heffro	Heffron Transportation
HNTB--	HNTB
Howell	Howell Consulting, LLC
HRA---	Heritage Research, Inc.
IBI___	IBI
IlArts	Illumination Arts, LLC
JDWhit	JD White
JLA___	Jeanne Lawson Associates Inc.
JohCla	John Clark
JohPar	John Parker Consulting LLC
JohRei	John Reilly Associates International, LTD.
LIS---	Luna Jimenez Seminars
Markgr	Tom Markgraf & Associates
METRO-	METRO
MicMin	Michael Minor & Associates
NatCon	National Constructors Group
NCTCOG	North Central Texas Council of Governments
NezPer	Nez Perce Tribe
NGKE--	Nossaman Guthner Know Elliot, LLP
NPS___	National Parks Service
ODOT--	Oregon Department of Transportation
Parisi	Parisi Associates
Parson	Parsons Transportation Group
PB----	PB
PBCons	PB Consult, Inc.
PMX---	Parametrix, Inc.
PRG---	Pacific Rim Geotechnical, Inc
PSRC__	Puget Sound Regional Council
RSG___	Resource Systems
RTC---	Regional Transportation Commission
S@Work	Solutions@Work
SACOG_	Sacremento Area Council of Governments
ShaWil	Shannon & Wilson
Siegel	Siegel Consulting
Siletz	Siletz Tribe
Skiles	Skiles & Associates, Inc.

CodeID	Description
SorGar	Sorin Garber Consulting
Spokan	Spokane Tribe
ToArch	Touchstone Architecture & Consulting, PA
TriMet	TriMet
TW----	Thomas Wright
TWE---	TW Environmental, Inc.
TY Lin	T.Y. Lin INternational
UFS___	Universal Field Services Inc.
Umatil	Confederated Tribes of the Umatilla Reservation
Underh	The Underhill Company, LLC
Vollme	Vollmer / Stantec
WalPar	Walker Parking
WarmSp	Confederated Tribes of Warm Springs
WayKob	Wayne Kober
WilOtt	William P. Ott
Wongdo	Wongdoody Communciations LLC
WSDOT-	Washington State Department of Transportation
Yakama	Yakima Nation
Zimmer	Zimmer Gunsul
JT	Joint ODOT WSDOT
NA	Not Applicable
OR	Oregon Department of Transportation
WA	Washington State Department of Transportation

Appendix C

Examples of Forms

This page left blank intentionally.

Example of CRC Reporting : Same Data, Different Perspectives

The report to the left depicts all costs of the project broken down by individual agreements.

Cost Report Sorted By Agreement

Report Showing Cost by Agreement

Phase 1 - Environmental Impact Statement (EIS) | Project # XL-2268 | Columbia River Crossing Project

Description	Current Budget	Commit'd Costs	Uncommit Costs	Cost To Date	Cost To Complete
CALTRANS GCA 5244	4,613	4,613	0	974	3,639
CH2MHill Y8289-AA	45,867	45,867	0	41,331	4,536
City of Portland (PDOT) GCA 5586	64,158	64,158	0	64,158	0
City of Portland GCA 4842	164,560	164,560	0	159,138	5,422
City of Vancouver GCA 4811	97,543	97,543	0	25,610	71,933
City of Vancouver GCA 5757	75,600	75,600	0	37,278	38,322
C-Tran GCA 4844	140,799	140,799	0	101,420	39,379
David Evans & Associates Base Contract	32,198,113	0	32,198,113	0	32,198,113
David Evans & Associates Y9245 Task Order AA	292,515	292,515	0	292,515	0
David Evans & Associates Y9245 Task Order AB	3,296,665	3,296,665	0	3,296,665	0
David Evans & Associates Y9245 Task Order AC	13,310,188	13,310,188	0	13,310,188	0
David Evans & Associates Y9245 Task Order AD	23,992,188	23,923,833	0	23,148,497	775,337
David Evans & Associates Y9245 Task Order AE	75,000	75,000	0	65,439	9,561
David Evans & Associates Y9245 Task Order AF	22,101,384	22,101,384	0	2,283,559	19,817,825
DOJ - Nossaman Agreement	500,000	500,000	0	110,376	389,624
DOT Labor and Direct Expense - ODOT	8,000,000	8,000,000	0	2,967,466	5,032,534
DOT Labor and Direct Expense - WSDOT	8,000,000	8,000,000	0	5,708,512	2,291,488
HDR - Value Engineering and Risk Assessment Y10025 Task AB	335,393	335,393	0	288,533	46,860
HDR - Y10438 AA Pre Task VE Study	7,000	7,000	0	0	7,000
HDR - Y10438 AB Constructability Review Value Engineering	288,500	288,500	0	0	288,500
HDR Y10025 - Cost Benefit	170,000	170,000	0	169,970	30
HDR Y10026 Task AB - Risk Assessment	68,000	68,000	0	0	68,000

Prolog Manager Printed on: 12/31/2008 Prolog Page 1

The report below shows all of the cost of the project broken down by individual tasks. Notice that the bottom line amounts on the two reports are the same. This is because it is the same information viewed in two different ways.

Cost Report Sorted By Agreement

Report Showing Cost by Agreement

Description	Current Budget	Commit'd Costs	Uncommit Costs	Cost To Date	Cost To Complete
HDR-HLB Decision Economics Y8889 Task Order AP	64,600	64,600	0	51,221	13,379
HNTB Contract Y8671 Task Order AA	481,000	481,000	0	477,868	3,132
METRO GCA 4843	750,000	750,000	0	750,000	0
METRO GCA 5744	552,160	552,160	0	210,765	341,395
National Constructors Group Y8897 Task Order BH	14,800	14,800	0	9,067	5,733
NPS GCA 5736 Base Agreement	178,237	0	178,237	0	178,237
NPS GCA 5736 Task AA	21,763	21,763	0	0	21,763
ODOT 23472 WOC 6 Amend 1 - CH2MHill IAMP Hayden Island & M	15,927	15,927	0	0	15,927
ODOT 23823 WOC 4 - Lou Schwab ROW Acquisition Coordination	24,677	24,677	0	0	24,677
Parsons Brinckerhoff Y8074-AH	12,303	12,303	0	11,803	500
Parsons Transportation Group Y8891 Task Order BU	23,000	23,000	0	12,772	10,228
Peer Review Panel Review - 2008	6,200	6,200	0	2,236	3,964
Risk Item: Lid Design Competition Vancouver	0	0	0	0	350,000
RTC GCA 4767	219,817	219,817	0	219,817	0
RTC GCA 5647	202,345	202,345	0	114,800	87,545
Shannon & Wilson Y10218 Task Order AB	625,049	625,049	0	0	625,049
Solutions@Work	8,800	8,800	0	3,450	5,350
Sound Transit VE Agreement	1,004	1,004	0	1,004	0
The Underhill Company, LLC Y9267	100,000	100,000	0	16,485	83,515
Tribal Agreements	101,986	26,986	75,000	5,738	96,249
TriMet GCA 4793	143,458	143,458	0	143,447	11
TriMet GCA 5667	168,468	168,468	0	112,920	55,548
Wongdoody Y8417-AS	132,000	132,000	0	22,723	109,277
WSDOt HQ Task 4-07 : Crux Subsurface Inc.	655,450	655,450	0	587,167	(44,186)
Y10022 BC Parsons CEVP CRA	45,000	45,000	0	0	45,000

Prolog Manager Printed on: 12/31/2008 Prolog Page 2

Cost Report Sorted By Agreement

Report Showing Cost by Agreement

Grand Totals:	117,776,130	85,256,426	32,451,350	54,824,911	63,120,396

Columbia River CROSSING

Cost Report by Task

Report Showing Cost by Task

Phase 1 - Environmental Impact Statement (EIS) | Project # XL-2268 | Columbia River Crossing Project
700 Washington Ave. Vancouver, Wa 98660 | Tel: 360-737-2726 Fax: 360-816-2157

Description	Current Budget	Cost This Period	Uncommit Costs	Cost To Date	Cost To Complete
N/A - Not Task Specific	32,282,551	0.00	32,273,113	8,675,978	23,956,573
1.0 - Project Management	5,712,217	71,135.28	0	3,523,485	2,187,814
2.0 - Project Controls	3,646,908	66,096.54	0	2,068,486	1,576,724
3.0 - Financial Structures	5,271,859	48,059.08	0	2,044,565	3,227,733
4.0 - Communications	7,498,346	85,579.90	0	4,179,181	3,319,165
5.0 - Transportation Planning	7,690,999	105,701.86	0	4,346,891	3,344,041
6.0 - Environmental	13,997,539	141,915.37	178,237	7,551,822	6,381,011
7.0 - Transit Engineering	10,602,593	100,879.18	0	6,322,789	4,278,972
8.0 - Design Engineering	29,166,143	481,826.18	0	14,617,281	14,435,821
9.0 - Implementation Plan	816,629	0.00	0	577,018	239,611
MPD Scoping Process	1,038,685	0.00	0	911,678	127,007
Tribal Activities	26,986	0.00	0	5,738	21,249
Right of Way	24,677	0.00	0	0	24,677
Grand Totals:	117,776,130	1,101,193.39	32,451,350	54,824,911	63,120,396

Prolog Manager Printed on: 12/31/2008 Prolog Page 1

This page left blank intentionally.

Example of CRC Reporting : Drill Down Into The Data

1

DEA Cost Report Sorted By Agreement

Report Showing Cost by Total for Each Task Order

Phase 1 - Environmental Impact Statement (EIS) | Project # XL-2268 | Columbia River Crossing Project

Description	Current Budget	Commit'd Costs	Uncommit Costs	Cost To Date	Cost To Complete
David Evans & Associates Base Contract	32,198,113	0	32,198,113	0	32,198,113
David Evans & Associates Y9245 Task Order AA	292,515	292,515	0	292,515	0
David Evans & Associates Y9245 Task Order AB	3,296,665	3,296,665	0	3,296,665	0
David Evans & Associates Y9245 Task Order AC	13,310,188	13,310,188	0	13,310,188	0
David Evans & Associates Y9245 Task Order AD	23,992,188	[illegible]	0	23,148,497	775,337
David Evans & Associates Y9245 Task Order AE	75,000	75,000	0	65,439	9,561
David Evans & Associates Y9245 Task Order AF	22,101,384	22,101,384	0	2,283,559	19,817,825
Grand Totals:	95,266,054	62,999,585	32,198,113	42,396,863	52,800,836

1. This first report is a query of all DEA task orders to the project. The drill down begins with Task AB which is circled.

2

Columbia River CROSSING

DEA Task AB Cost Sorted by Sub Agreement

Budget, Commitments and Actual Cost

Description	Current Budget	Commit'd Costs	Uncommit Costs	Cost To Date	Cost To Complete
CH2M Hill, Inc.	383,229.34	383,229.34	0.00	383,229.34	0.00
Conkling Fiskum	5,770.00	5,770.00	0.00	5,770.00	0.00
Cooper Zietz and Engineers, Inc.	28,452.00	28,452.00	0.00	28,452.00	0.00
David Evans Associates, Inc.	779,357.94	779,357.94	0.00	779,357.94	0.00
Heritage Research, Inc.	48,896.70	48,896.70	0.00	48,896.70	0.00
JD White	53,515.50	53,515.50	0.00	53,515.50	0.00
Jeanne Lawson Associates Inc.	27,343.28	27,343.28	0.00	27,343.28	0.00
Luna Jimenez Seminars	28,500.00	28,500.00	0.00	28,500.00	0.00
Tom Markgraf & Associates	42,030.00	42,030.00	0.00	42,030.00	0.00
Nossaman Guthner Know Elliot, LLP	21,269.01	21,269.01	0.00	21,269.01	0.00
Parisi Associates	59,087.55	59,087.55	0.00	59,087.55	0.00
PB	570,267.23	570,267.23	0.00	570,267.23	0.00
PB Consult, Inc.	140,350.60	140,350.60	0.00	140,350.60	0.00
Parametrix, Inc.	1,024,874.30	1,024,874.30	0.00	1,024,874.30	0.00
Pacific Rim Geotechnical, Inc	12,375.94	12,375.94	0.00	12,375.94	0.00
Sorin Garber Consulting	8,850.17	8,850.17	0.00	8,850.17	0.00
TW Environmental, Inc.	27,299.83	27,299.83	0.00	27,299.83	0.00
Vollmer / Stantec	12,690.45	12,690.45	0.00	12,690.45	0.00
Wayne Kober	22,505.64	22,505.64	0.00	22,505.64	0.00
Grand Totals:	3,296,665	3,296,665	0	3,296,665	0

2. This report shows a detail of all the subcontracts included within Task AB. Note the bottom line amount is the same. For purposes of our drill down we will choose Conkling Fiskum.

3. This report is an agreement status report of the Conkling Fiskum subcontract within Task AB. The first page of the report shows the contract amount and all of the pay requests submitted.

4. The second page of the Conkling Fiskum report shows the individual budget and cost amounts associated with the subcontracts. Notice that this also includes the task charged to.

3

Columbia River CROSSING

Y9245 Task AB Conking Fiskum McCormick Subcontract Status Report

Report showing agreement amounts, ammendments and amounts paid to date.

Contract Number: AB CFM — **Conking Fiskum & McCormick**

Y9245 Task AB Conking Fiskum McCormick Subcontract

Type of Contract

Subcontract

Main Contact

Scope of Work:

Miscellaneous General Notes:

Contract Date	Notice To Proceed	Final Completion
5/31/2005	5/31/2005	January 31, 2007

Change Order Summary:

CO No	Date	Description	Status	NTP	Executed	Days	Appr Amt
						Original Contract Amount:	5,770.00
						Revised Contract Amount:	5,770.00

Contract Invoice Summary:

Sequence	From	To	Date	Total	Current Due
1	10/2/2005	11/1/2005	11/10/2005	2,810.00	2,810.00
2	1/2/2006	2/1/2006	12/10/2005	4,770.00	1,960.00
3	2/2/2006	3/1/2006	1/10/2006	5,770.00	1,000.00
TOTAL					5,770.00

Contract Budget:

4

Columbia River CROSSING

Y9245 Task AB Conking Fiskum McCormick Subcontract Status Report

Report showing agreement amounts, ammendments and amounts paid to date.

Report showing agreement amounts, ammendments and amounts paid to date.

Description	Current Budget	Uncommitted Cost	Commit'd Costs	Cost To Date
AB 4.0 Communications General S	$0.00	$0.00	$0.00	$0.00
AB 4.0 Communications General S	$5,770.00	$0.00	$5,770.00	$5,770.00
Total 4.0 - Communications		$ 0.00	$ 5,770.00	$ 5,770.00
Grand Totals:	$ 5,770.00		$ 5,770.00	$ 5,770.00

This page left blank intentionally.

Appendix D

References

This page left blank intentionally.

Appendix D
References

- Washington Administrative Code (WAC)
  - WAC 196 – Licensing
  - WAC 332-120 – Survey Monuments – removal or destruction
  - WAC 332-130 – Minimum Standards for land boundary surveys and geodetic control surveys and guidelines for the preparation of land descriptions
  - WAC 458.20.101 – Tax registration and reporting
- Revised Code of Washington (RCW)
  - RCW 18 – Business and Professions
  - RCW 18.08 – Architects
  - RCW 18.43 – Engineers and Land Surveyors
  - RCW 18.96 – Landscape Architects
  - RCW 36
    - RCW 36.57A – Public Transportation Benefit Areas (PTBA)
  - RCW 39 – Public Contracts and Indebtedness
    - RCW 39.04 – Public Works
    - RCW 39.04.250 – Payments Received on Account of Work Performed by Sub-contractor – Disputed Amounts – Remedies. (Prompt Pay Law)
    - RCW 39.19 – Office of Minority and Women's Business Enterprises
    - RCW 39.29 – Personal Service Contracts
    - RCW 39.34.030 – Joint powers
    - RCW 39.76.011 – Interest on Unpaid Public Contracts – When Payment is Considered to Be Made
    - RCW 39.80 – Contracts for Architectural and Engineering Services
  - RCW 43
  - RCW 43.19
  - RCW 47
    - RCW 47.52.020, Powers of Highway authorities — State facility, county road crossings
  - RCW 48 – Insurance

- RCW 51 – Industrial Insurance
- RCW 58 – Boundaries and Plats
- RCW 82 – Excise Taxes
    - RCW 82.32.030 – Registration certificates – Threshold levels
    - RCW 82.32.045 – Taxes – When due and payable – Reporting periods – Verified annual returns – Relief from filing requirements

- Oregon Revised Statutes (ORS)
    - ORS 190.410 to 190.440 – 190.420
    - ORS 209 – County Surveyors
    - ORS 267.010 though and including 267.430
    - ORS 279A
        - ORS 279A.060
    - ORS 279B
    - ORS 279C
    - ORS 381.005 to 381.820
- Washington and Oregon Statutory and Case Law
- Code of Federal Regulations (CFR)
    - Department of Transportation 49 CFR Part 18 – Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments
    - Department of Transportation presented in Title 49, CFR, Part 21, as revised
    - 49 CFR Part 26 – Participation by Disadvantaged Business in Department of Transportation Programs
    - 49 CFR Part 29 – Department of Transportation's Final Rules on Department of Contractors, Subcontractors Performing Under Grants
    - 49 CFR, Part 659 – Rail Fixed Guideway System
    - Buy America, 49 CFR Part 661
    - 2 CFR Part 225 and FTA Circular 5010.1C
- United States Code (USC)
    - Brooks Act – 40 United States Code (USC) Chapter 10 Subchapter VI – Selection of Architects and Engineers

  Federal Certification, Assurances, and Guidance

    - Civil Rights Act of 1964 – 42 USC Chapter 21 Subchapter V Section 2000d through 2000d-4a – Federally Assisted Programs

  - Federal-aid Highway Act of 1973 – 23 USC Chapter 3 Section 324 – Prohibition of Discrimination on the Basis of Sex
  - Rehabilitation Act of 1973 – 29 USC Chapter 16 Subchapter VI Section 794 – Nondiscrimination Under Federal Grants and Programs
  - Age Discrimination Act of 1975 – 42 USC Chapter 76 Sections 6101 et seq – Age Discrimination in Federally Assisted Programs
  - Justice System Improvement Act of 1979 – 42 USC 3701, et seq.
  - Civil Rights Restoration Act of 1987 – Public Law 100-259
  - American with Disabilities Act of 1990 – 42 USC Chapter 126 Section 12101 et seq. – Equal Opportunity for Individuals with Disabilities
  - Title 49 U.S.C. §5309(e)(1)(A), FTA's Final Rule on Major Capital Investment Projects of September 2001 and FTA Circular 5200.1A, "Full Funding Grant Agreements Guidance."
- FHWA Stewardship and Oversight Agreement (Feb 19, 2008)
- Transportation Equity Act for the 21st Century (Public Law 105-178 as amended by Title IX of Public Law 105-206)
- Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)
- I-5 Strategic Plan, 2002
- Code of Tri-County Metropolitan Transportation District of Oregon
- WSDOT Risk Management Manual
- FTA
  - FTA Master Grant Agreement
  - FTA's Best Practices Procurement Manual
  - FTA Best Practices, Chapter 6.7
  - FTA Master Agreement (MA) dated October 1, 2007
  - FTA 5309 New Starts Program
  - FTA Circular 4220.1E, as revised
  - FTA Circular 4220.1E, Third Party Contracting Guidelines, as revised.
  - FTA Circular 5010 Grant Management Guidelines
  - FTA Circular 5010.1C
  - FTA Circular 9400.1A, "Federal Transit Administration Design and Art in Transit Projects"
- TriMet??
  - Executive Order No. 13208 - cited in Section 2.6
  - Executive Order 13202 - cited in Section 2.6

- WSDOT Construction Manual M-41-01
- State Safety Oversight
- Washington State Department of Transportation
  - Highway Surveying Manual M22-97
  - Plans Preparation Manual M22-31
- Oregon Department of Transportation
  - Pre-Construction Survey Standards and Procedures
  - ODOT R/W Monumentation Policy
  - Right of Way Monumentation Surveys
  - Control Recovery and Retracement Surveys

Appendix E

Risk Tracking Matrix

This page left blank intentionally.

Discipline Title

Date

Discipline Lead/Manager Name **Telephone Number** (xxx) xxx-xxxx

DISCIPLINE RISK TRACKING

	Risk Identification								Qualitative Analysis			Risk Owner	Risk-Response Strategy		Monitoring and Control	
Priority	**Status**	**ID #**	**Date Identified Project Phase**	**Risk Event** (threat/opportunity)	**SMART Column**	**Risk Trigger**	**Impact Area**	**Affected MDL/WBS Level 2 process**	**Probability**	**Impact**	**Risk Matrix**		**Strategy**	**ACTION TO BE TAKEN** (include advantages and disadvantages)	**Status Interval or Milestone Check**	**Date, Status and Review Comments**
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Instructions	**Active**=actively monitored & controlled **Dormant**=risk is not currently a high priority, but may become active in the future. **Retired**=no longer a threat to project objectives.	**E1**	For example: 6/30/99 Scoping	Risk is an uncertain event or condition that, if it occurs, has a positive (opportunity) or negative (threat) on a project. For example; Wetland Mitigation requires additional R/W.	Detailed description of the risk. Includes information on the risk that is **Specific, Measureable, Attributable, Relevant** and **Timebound**. Describe the consequences of the risk to scope, schedule, budget or quality.	Triggers are indications that a risk has occurred or is about to occur. Used to determine when to implement the Risk Response Strategy. For example: Wetland impact is greater than 1/2 acre.	Is the primary impact to the scope, schedule, or budget?	Which WBS element will be modified as part of the response strategy? For example: PC-19 Environmental Permits	Assessment of the likelihood of occurrence. Valid entries are Low or High.	The severity of the risk's effect on the projects objectives. Valid entries are Low or High.	**High**: Substantial impact on cost, schedule, or technical. Substantial action required to alleviate issue. **Low**: Minimal impact on cost, schedule, or technical. Normal management oversight	Name of the person or office responsible for managing the risk event.	**A**voidance **T**ransference **M**itigation **A**cceptance (See PM Online Guide for strategy definitions.)	Develop options and determine actions to be taken in response to the risk event. Immediate action may be required at the time of identification. Estimate value of risk and estimate cost to respond.	For example: Completion of wetland delineation expected: 2/28/00	For example: Last status update 4/30/00. Wetland delineation completed 3/15/00. Over 1 acre of wetland was delineated, action is being taken to expedite meetings with regulatory agencies & expedite the effort to provide appropriate wetland mitigation & attain project permits.
								WBS 165 Perform Environmental Studies and Prepare Draft Environmental Document (DED)			Probability H L L H Impact					
											Probability H L L H Impact					
											Probability H L L H Impact					
											Probability H L L H Impact					
											Probability H L L H Impact					
											Probability H L L H Impact					
											Probability H L L H Impact					

This page left blank intentionally.

Appendix F

TriMet Bus Fleet Management Plan

This page left blank intentionally.

TriMet Bus Fleet Management Plan

Technical Report

Revision 2

Rev.	Date	Approval	Reason
1	08/01/08		Original
2	08/26/09		Updated (PMOC Review Comments Addressed)

August 26, 2009

Columbia River CROSSING

Title VI

The Columbia River Crossing project team ensures full compliance with Title VI of the Civil Rights Act of 1964 by prohibiting discrimination against any person on the basis of race, color, national origin or sex in the provision of benefits and services resulting from its federally assisted programs and activities.

Americans with Disabilities Act (ADA) Information

If you would like copies of this document in an alternative format, please call the Columbia River Crossing project office at (360) 737-2726 or (503) 256-2726. Persons who are deaf or hard of hearing may contact CRC using Telecommunications Relay Service by dialing 7-1-1.

¿Habla usted español? La informacion en esta publicación se puede traducir para usted. Para solicitar los servicios de traducción favor de llamar al (503) 731-3490.

TABLE OF CONTENTS

List of Figures

List of Tables

Appendices

This page left blank intentionally.

ACRONYMS

ADA	Americans with Disabilities Act
APC	Automatic Passenger Counters
ATP	Accessible Transportation Programs
ASA	Automated Stop Announcements
BDS	Bus Dispatch System
CAT	Committee on Accessible Transportation
CSI	Customer Service Information
FTA	Federal Transit Administration
MAX	Metropolitan Area Express
MMIS	Maintenance Management Information System
MTP	Medical Transportation Program
PIP	Productivity Improvement Process
PM	Preventive Maintenance
SMART	South Metro Area Rapid Transit
SOPs	Standard Operating Procedures
TC	Transit Center
TIP	Transit Investment Plan
WES	Westside Express Service

This page left blank intentionally.

1. Introduction

TriMet was created in 1969 as a special district of the State of Oregon and is governed by a seven-member board of directors appointed by the Governor. TriMet's 575-square-mile district serves 1.3 million people in the urban portions of Clackamas, Multnomah, and Washington counties.

TriMet plays an important role in the Portland Metropolitan area's pursuit of regional growth management goals (known as the *Region 2040 Growth Concept*). Improving bus service to regional centers, expanding the Metropolitan Area Express (MAX) light rail system, and continually improving the quality of the TriMet system provides regional residents with a comfortable and convenient transportation choice.

Metro is the regional government that develops long-term plans for land use and transportation. TriMet is a partner with Metro and local governments in land use and transportation planning. TriMet's commitment to improve service in concert with growth management is a basis for the region's 50-year land use vision, the *Region 2040 Growth Concept*.

The *Region 2040 Growth Concept*, adopted by Metro in 1995, preserves access to nature and builds better communities by maintaining a compact urban form with increased travel options. It directs most new development to population centers and along corridors that can be well served by transit, walking, and bicycling. Focusing jobs, housing, and services in these areas takes best advantage of transit system investments by reducing the need to drive. MAX is TriMet's light rail system serving the Portland metropolitan area. Opening in 1986, today MAX service includes three lines (Blue, Red, and Yellow) and will soon include a fourth line with Green line service opening on September 12, 2009. Currently, three MAX lines run on 44 miles of track and serve 64 stations. MAX has become a national model for community support, land-use/ transportation planning, public art, and environmentally friendly construction practices.

TriMet operates 83 bus routes throughout the Portland, Oregon, metro area. Many bus lines connect with MAX Light Rail and provide Frequent Service (every 15 minutes or better during the day, every day).

Frequent Service buses arrive as often as MAX trains, every 15-minutes or better from the early morning to late in the evening, seven days a week. Frequent service connects Regional Centers in the 2040 Plan with each other and with the Central City and serves Main Streets.

In 1998, four lines had 15-minute or better service available each day of the week. Today, the Frequent Service network comprises 16 bus routes and is 164 miles long. Line 4-Division was upgraded in October 2003, doubling service along Division St. east of I-205. Line 75-Lombard/39th Ave. joined the Frequent Service network in May 2004, as well as Line 57-TV Hwy/Forest Grove in September 2004. As a result of these investments in new service, over 40 percent of the population of the TriMet District lives within one-half mile of Frequent Service.

TriMet provides transportation options for thousands of Portland area residents every day. Important to the TriMet system are customer amenities and services. Over the last few years TriMet has improved lighting at bus stops, invested in bus shelters, low-floor air-conditioned buses, new bus stop signs and customer information at stops, improved pedestrian access with sidewalks and safer street crossings, traffic management tools and bus stop re-spacing to decrease travel time and increase reliability, Transit Tracker with real arrival times by phone, and improvements to the TriMet website and on-line trip planning.

TriMet's LIFT Program provides complementary, door-to-door transportation services to Portland area residents who are functionally unable to use TriMet's regular fixed route services because of a disability. LIFT provides service to locations within 3/4 of a mile of either side of TriMet's 85 fixed routes.

Based on a recommendation by the Special Needs Transportation Policy Advisory Committee to the TriMet Board, TriMet has provided complementary LIFT service in the Metro area since 1980. TriMet became fully compliant with the Americans with Disabilities Act (ADA) in 1996, and since has provided service that meets and exceeds requirements of the ADA.

TriMet's Accessible Transportation Programs (ATP) Department is part of the Operations Division, which also includes bus and rail service. ATP is made up of two programs—TriMet LIFT and the Medical Transportation Program (MTP). The LIFT Program is expressed in all caps to distinguish the program name from the vehicle lifts. LIFT is not an acronym.

TriMet operates LIFT services through contracts with private sector companies, which provide staff for all operating functions including transportation, maintenance, dispatch, and customer services. In addition, TriMet contracts with a taxi company to provide backup transportation that efficiently accommodates fluctuations in demand. TriMet provides vehicles, operating facilities, and equipment for all program elements aside from taxi service. TriMet is responsible for program, contract, and operations management for the LIFT Program, and for determining eligibility of LIFT clients.

During Fiscal Year 2009, TriMet provided 1.09 million LIFT rides.

2. Fleet and Maintenance Overview

2.1 Fleet Overview

Fixed Route

Due to the recent recession, starting in September 2009, the fixed route fleet at TriMet will consist of 619 vehicles, with the fixed route contingency fleet composed of 38 vehicles for a grand total of 657 buses. TriMet's entire bus fleet is broken down into the following categories:

- 53 high-floor 30-foot diesel buses
- 237 high-floor 40-foot diesel buses
- 359 low-floor 40-foot diesel buses
- Two low-floor 40-foot hybrid diesel-electric buses
- Three cutaway gasoline shuttle vans

TriMet retains a contingency fleet for emergency purposes. Currently, there are 26 high-floor 40-foot diesel buses and 12 high-floor 30-foot diesel buses in the contingency fleet.

Paratransit – LIFT Program

The LIFT fleet consists of 254 diesel, cutaway, 24-foot small buses and 15 gasoline, 17-foot sedans. All of the small buses are lift-equipped and have either three or four securement areas for people using a wheelchair or scooter. Seating for ambulatory customers is a combination of seats fixed to the bus floor and seating that is attached to and can be folded up against the interior wall of the bus, to open floorspace for wheelchair securement. Ambulatory seating varies by sub-fleet with a seated maximum of 13 and a minimum of six. The number of seats available for ambulatory customers depends on the number of wheelchair spaces occupied. The sedan fleet of 15 vehicles serves ambulatory customers and is useful when the pick-up location or the drop-off location presents access challenges for the small buses. See Appendix A for the LIFT vehicle fleet details.

2.2 Service Overview

As of June 30, 2009, the fixed route fleet averages 41,582 miles per year per bus. The paratransit fleet averages 31,931 miles per year per vehicle. Vehicles are in operation 24 hours a day with the majority of service between 4:00 a.m. and 1:00 a.m.

Time spent outside of revenue operation is used for performing all necessary service, cleaning, and maintenance to the vehicles. TriMet's Field Operation Dispatch office is open 24 hours a day, seven days a week and is responsible for assigning replacement vehicles when needed in accordance with the available vehicle list from Maintenance. Before service operation, all vehicles are given a pre-trip inspection as follows:

- Start-up and low air warning system test
- Exterior walk around
- Interior inspection
- Operator’s compartment set up and checks

Defects found upon completion of the pre-trip inspection are recorded on the Trip Sheet assigned to the vehicle and resolved by maintenance when the vehicle is no longer in revenue operation.

The LIFT Program operations model consists of a central dispatch contract, a central maintenance contract and three transportation contracts. LIFT Central Dispatch receives ride requests; schedules and dispatches rides; and responds to customer contacts. LIFT Central Maintenance performs all vehicle maintenance, excluding those minor maintenance activities specifically outlined as the responsibility of the LIFT Transportation contractor. LIFT Transportation manages employees who transport customers in TriMet-owned vehicles according to schedules produced by LIFT Central Dispatch. TriMet has general program and operations direction and oversight responsibility.

2.3 Existing Bus Fleet

*All vehicles in operation are wheelchair accessible and adhere to ADA compliance standards. Table 2-1, TriMet Fixed Route Fleet, provides detailed information on the 616 vehicles used for fixed-route revenue operations. * The capacity is noted as Seated / Seated+Standing*

Table 2-2, TriMet Paratransit Fleet, provides detailed information on the 269 vehicles used for paratransit operations. Table 2-3, TriMet Contingency Fleet, provides detailed information about the fixed route contingency fleet.

Table 2-1. TriMet Fixed Route Fleet (as of June 1, 2009)

Manufacturer	Length	Capacity*	Engine	Transmission	Model	Year	Size
Gillig	40	43/64	Cummins L-10	Voith D863	Phantom	1990	41
Gillig	30	28/35	Cummins L-10	Voith D863	Phantom	1990	19
Gillig	30	28/35	Cummins L-10	Voith D863	Phantom	1991	12
Flexible	40	43/64	Cummins L10-CE	Voith D863	40102-6C	1992	82
Flexible	30	28/35	Cummins L10-CE	Voith D863	30102-6C	1992	10
Flexible	40	43/64	Cummins M11 Celect	Voith D863	40102-6C	1994	26
New Flyer	40	39/56	DD Series 50	Allison VR-731	D40LF	1997	22
Gillig	40	43/60	Cummins M11-280E	Allison B400R	Phantom	1997	60
Gillig	40	43/60	Cummins M11-280E	Voith D863.3	Phantom	1997	5
New Flyer	40	39/56	Cummins ISL CM850	Voith DGS PA	D40LF	1998	58
New Flyer	40	39/56	Cummins ISL CM850	Voith DGS PA	D40LF	1998	60
New Flyer	40	39/56	Cummins ISL CM850	Voith DGS PA	D40LF	2001	60
New Flyer	40	39/56	Cummins ISL 8.9	Allison EVD	D40LF	2002	2
New Flyer	40	39/56	Cummins ISL 280	Voith D864.3	D40LF	2002	55
New Flyer	40	39/56	Cummins ISL 280	Voith D864.3	D40LF	2002	25
New Flyer	40	39/56	Cummins ISL CM850	Voith D864.3	D40LF	2006	39
New Flyer	40	39/56	Cummins ISL CM850	Voith D864.5	D40LF	2009	40
Ford	19	12/12	5.4L EFI	5.6 AT w/OD	S341	2002	3
Total Fleet							616
Average Fleet Age (in years)							11.4

Note: Ford fleet is not counted in the total, as it is a seasonal shuttle service.

** The capacity is noted as Seated / Seated+Standing*

Table 2-2. TriMet Paratransit Fleet (as of June 1, 2009)

Manufacturer	Length	Capacity*	Engine	Transmission	Model	Year	Size
Ford	24'	9/9	7.3L DIT	4R100	El Dorado	1999	27
Ford	24'	9/9	7.3L DIT	4R100	El Dorado	2001	33
Ford	24'	13/13	7.3L DIT	4R100	El Dorado	2001	47
Ford	24'	13/13	7.3L DIT	4R100	El Dorado	2002	8
Ford	17'	5/5	4.6L V8	CVP	Interceptor	2005	15
Ford	24'	8/8	6.0L DIT	5R110	El Dorado	2006	39
Ford	24'	8/8	6.0L DIT	5R110	El Dorado	2007	49
Ford	24'	8/8	6.0L DIT	5R110	El Dorado	2008	1
Ford	24’	12/12	6.0LDIT	5R110	El Dorado	2008	50
Total Fleet							269
Average Fleet Age (in years)							3.99

** The capacity is noted as Seated / Seated+Standing*

Table 2-3. TriMet Contingency Fleet (as of September 13, 2009)

Flexible Manufacturer	Length	Capacity*	Engine	Transmission	Model	Year	Size
Gillig	40	43/64	Cummins L-10	Voith D863	Phantom	1990	15
Gillig	30	28/35	Cummins L-10	Voith D863	Phantom	1990	11
Gillig	30	28/35	Cummins L-10	Voith D863	Phantom	1991	1
Flexible	40	43/64	Cummins L10-CE	Voith D863	40102-6C	1992	10
Flexible	40	43/64	Cummins M11 Celect	Voith D863	40102-6C	1994	1
Total Fleet							38
Average Fleet Age (in years)							18.8

** The capacity is noted as Seated / Seated+Standing*

2.4 Operating Spare Ratio

Fixed Route

Bus Maintenance's current standard is to maintain an 18% spare ratio to assure vehicle availability, and is based upon PM peak pullouts and calculated for 30' and 40' buses only. Smaller buses are not computed in as they are very small fleets, have higher spare ratios and are statistically insignificant. For small bus fleets (Ford vans), one vehicle is kept as a spare.

Paratransit

The goal for LIFT service delivery is to maintain an 16% spare ratio, which is based upon average peak pullouts. As of June 30, 2009, the maximum peak pullout was 232 vehicles. Refer to Appendix A for detailed LIFT fleet service requirements.

2.5 Current Maintenance Staffing

TriMet maintenance employees operate on a 24-hour, seven days a week work schedule. All shifts are staffed to accommodate scheduled preventive maintenance (PM) and fleet modifications as well as unscheduled repairs when vehicles are out of operation. Shifts are scheduled so that there is an overlap between shifts for communication relay. Table 2-4, TriMet Maintenance Employee Shift Distribution, illustrates employee distribution by shift.

Table 2-4. TriMet Maintenance Employee Shift Distribution

Position	Day	Swing	Night	*Other
Journey Mechanic	58	29	43	
Body Shop	8			
Unit Rebuild	13			
Maintenance Mechanic	3	2	2	
Helper	5	3	7	52
Apprentice Mechanic	20			
Spotter	3	3	3	
Cleaner	5			
Tire				7

** Other denotes a shift(s) that does not fall into TriMet's standard Day, Swing, or Night shift.*

LIFT vehicles are maintained by Penske Truck Leasing, Inc. employees and operates 18.5 hours a day, Monday through Friday, and 10.5 hours a day on the weekends with a designated on-call lead mechanic available 24 hours a day, seven days a week.

2.6 Labor Performance Indicators

Fixed Route

Labor performance is key to the successful operation of the Maintenance department. Periodic reviews are in place for supervisors and managers to measure attendance, miles per Journey Mechanic, and overtime usage. Performance goals for these items for Fiscal Year 09-10 are as follows:

- Attendance – maintain 92.5% or greater attendance rate.
- Miles per Journey Mechanic – maintain 14,000 miles or less per mechanic.
- Overtime – maintain costs at or below budgeted levels.

2.7 Maintenance Performance Indicators

Fixed Route

Each year the Maintenance department identifies goals that are critical to successful performance of the fixed-route fleet. Vehicles must be reliable, clean, safe, and accessible for both internal and external customers and annual goals are directed at meeting those standards in a cost-effective manner. A monthly benchmark report tracks the ability of the Maintenance department to meet its goals.

There are six goals for fiscal year 2009-2010:

1. Attendance must be 92.5% or greater for all maintenance employees.
2. Cost per vehicle mile must be $1.45 or less.
3. Percentage of scheduled repairs must be 70% or greater.
4. Bus inventory turns at 3.0 per month.
5. Road call mileage must be 15,000 miles or greater.
6. Safety rating must be 15 accidents per 200,000 work hours or less.

Previous goals have focused on overtime costs, spare ratio, preventive maintenance, on-time compliance, maintained pullouts, frequency of interior cleaning and steam cleaning, and repair to payroll hour ratios in addition to attendance, inventory value, cost per vehicle mile and road call mileage. When goals are consistently met, they become a regular part of operations and other goals are introduced.

Figure 2-1. TriMet Attendance Performance (as of July 1, 2009)

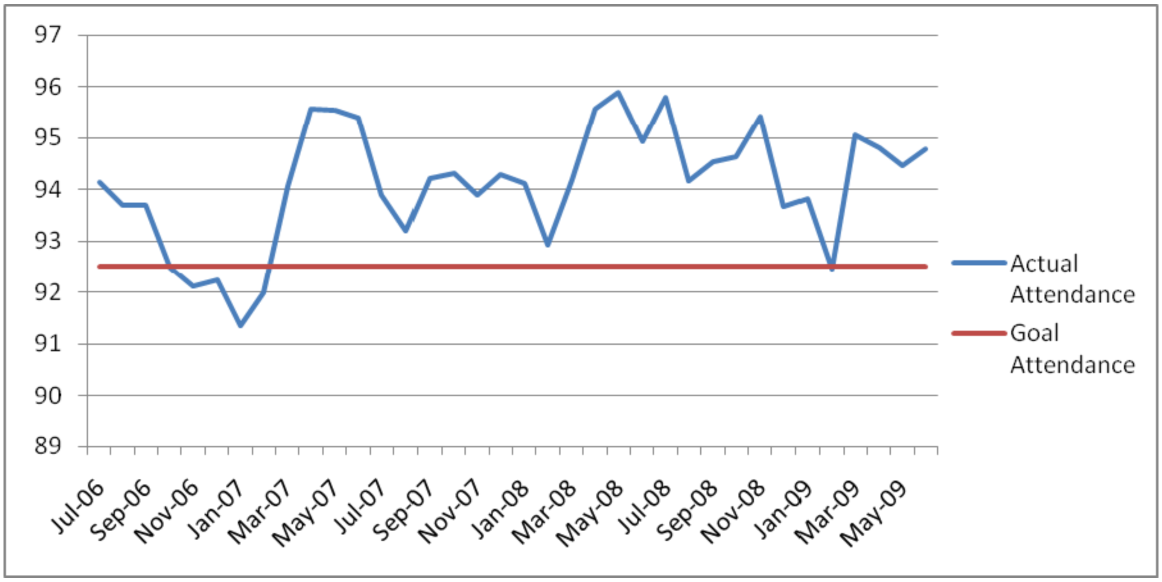


Figure 2-2. TriMet Overtime Performance (as of June 1, 2009)

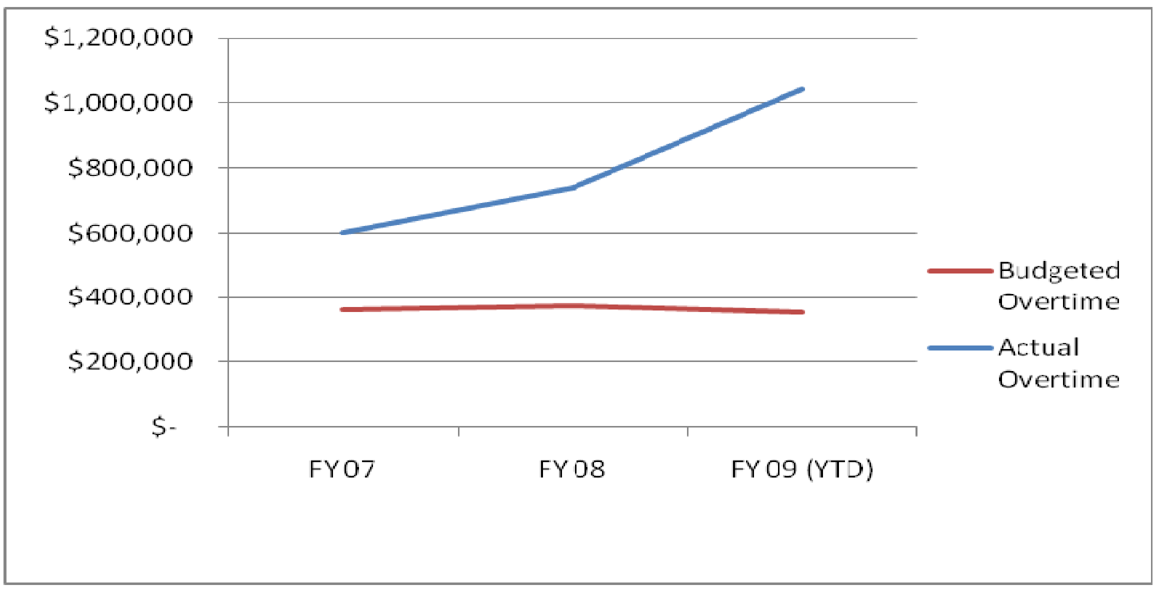


Figure 2-3. TriMet Labor Performance (as of June 1, 2009)

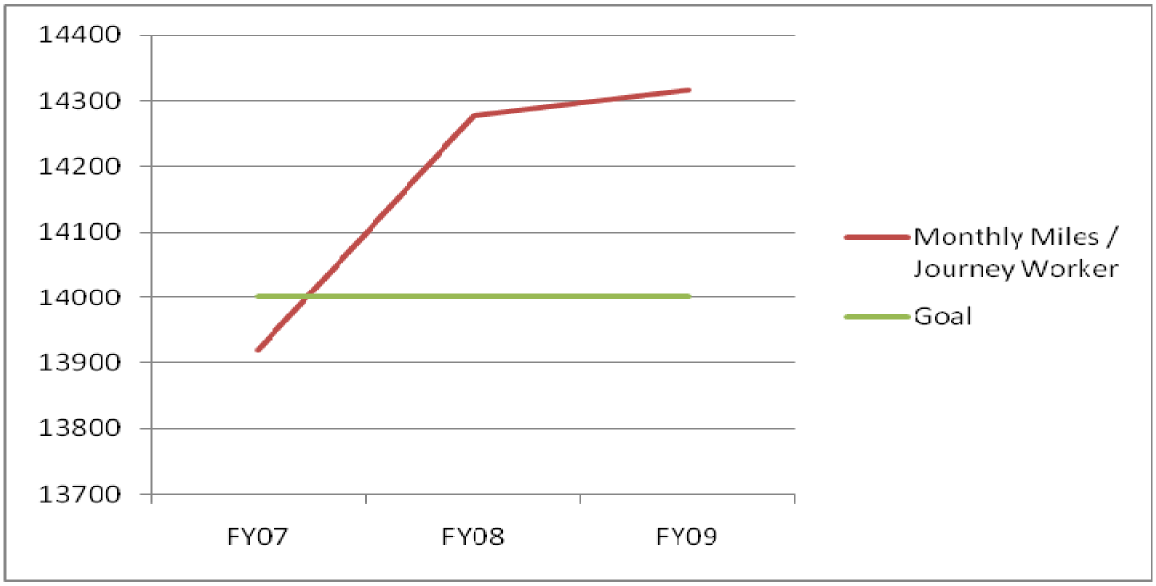
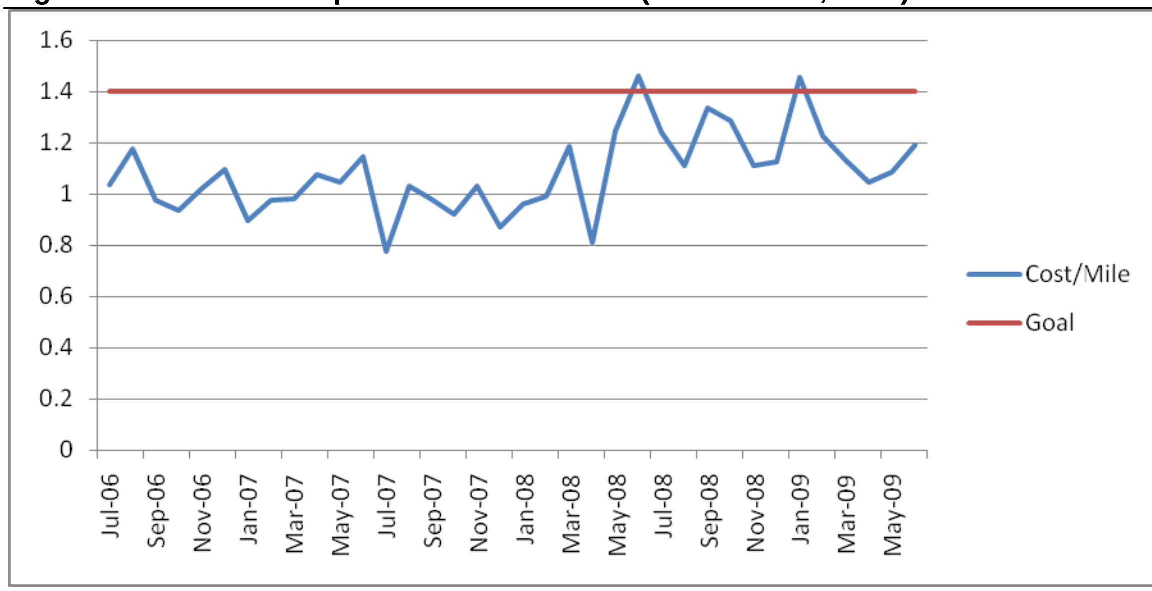
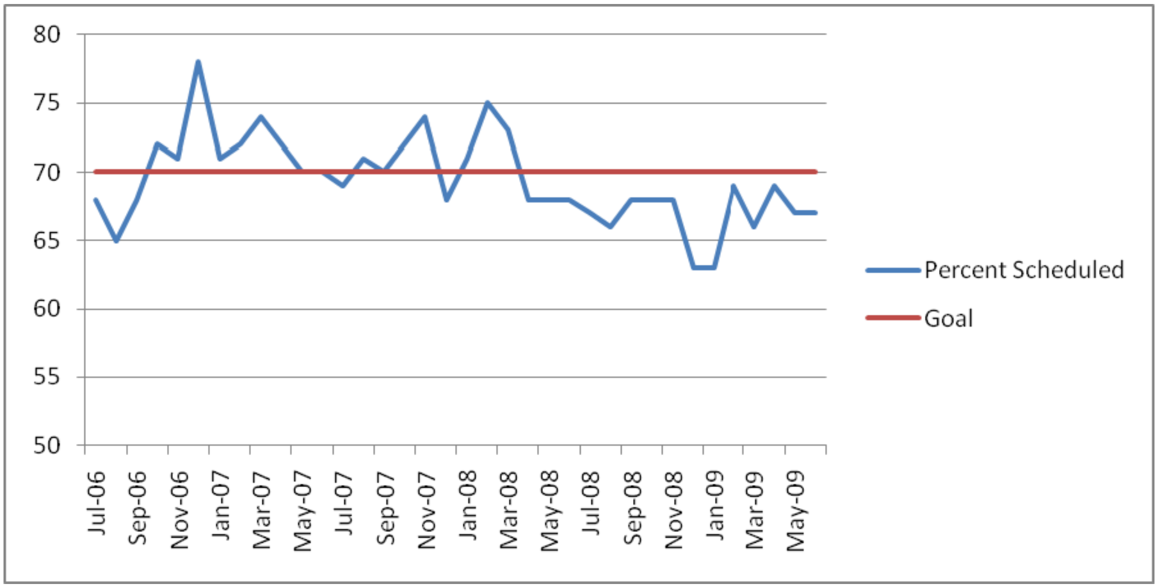


Figure 2-4. TriMet Cost per Mile Performance (as of June 1, 2009)



**Total cost of materials and services / bus mileage*

Figure 2-5. TriMet Scheduled vs. Unscheduled Work Performance (as of July 1, 2009)



2.8 Scheduled Preventive Maintenance

Fixed Route

All fixed route and LIFT vehicles are scheduled for regular preventive maintenance. Preventive maintenance schedules vary in accordance to the system on which the maintenance is performed. Inspection procedures vary slightly depending on the model and make of the vehicle and its components. The Appendices section of this document contains the detailed fleet management sheets for the following inspections.

2.8.1 General Preventive Maintenance

- B Inspection – Oil change, interior/exterior inspection, chassis lubrication, and brake adjustment
- C Inspection – B inspection plus oil sample, differential fluid level reading, and procedural check on lift and transmission systems for some buses
- D Inspection – C inspection plus procedural check of air and system, opacity reading, differential fluid change, and visual inspection of exhaust and steering systems

The schedule for general preventive maintenance varies by fleet and/or engine manufacturer. The interval for each type is listed in Table 2-5, General PM Intervals, below.

Please refer to Appendix D for detailed information on bus maintenance expenditures.

Table 2-5. General PM Intervals

PM	Vehicles manufactured by Gillig or Flexible with Cummins Engine	Vehicles manufactured by New Flyer or those with Detroit Diesel (DD) Engines
B	10,000 miles	7,000 miles
C	20,000 miles	14,000 miles
D	40,000 miles	28,000 miles

2.8.2 Transmission Preventive Maintenance

- L Inspection (every 18,000 miles) – Visual inspection, fluid drain and filter change, record fault codes, ATF sample and road test for proper shifts and retarder functions.
- LR Inspection (every 72,000 miles) – L inspection plus pan drop for metal and clutch check and operating pressure check.

2.8.3 Engine Preventive Maintenance

- E Inspection (every 50,000 miles) – Manual and electronic idle and valve checks and tune-up inspection.

2.8.4 Air Conditioning Preventive Maintenance

- ACB Inspection (every 24,000 miles) – ACA inspection plus clutch bearing lubrication, pressure and temperature check, and filter replacement.
- ACC Inspection (every 48,000 miles) – ACB inspection plus compressor area steam cleaning, voltage/amperage readings from motors and compressor operating efficiency tests.

2.8.5 Wheelchair Lift Preventive Maintenance

- WLR Inspection (every 12,000 miles) – clean platform, check ride and step height, inspect system for leaks, and lubricate all moving parts.
- WLX Inspection (every 48,000 miles) – WLR inspection plus fluid and filter change.

2.8.6 Other Preventive Maintenance

- FB (Farebox) Inspection (annual inspection) – Coin mechanism, bill transport, coin escrow, bill stuffer, logic board, and lock inspection, lube, adjust, and bulb replacement as needed.
- CAM (Camera System) Inspection (every 12,000 miles) – Procedural check of all cameras, data packs and data recorders.
- CBI (Contingency Bus Inspection) (every 90 days) – Brake adjustments, air, electrical, throttle, and interlock system operation check, and fluid level check for all contingency buses.

Paratransit

The paratransit fleet has two preventive maintenance inspections: "A" level service every 6,000 miles and B level service every 30,000 miles. As with fixed route inspections, the B service is more progressive than the A service. These consist of seven service sections:

1. Test drive
2. Under chassis and lube
3. Service
4. Upper chassis, engine and electrical
5. Engine inspection
6. Wheelchair lift
7. Final inspection

2.9 Scheduled Predictive Maintenance

Fixed Route

Predictive maintenance is performed on components that have exhibited a determined lifetime. Components are identified for predictive maintenance in accordance with their frequency of unscheduled repairs. Component replacement history by fleet type is statistically reviewed to determine the optimum replacement schedule. TriMet currently has twelve components on a predictive maintenance schedule: air dryers, brake application valves, brake relay valves (front and back), air compressors, fuel pumps, water pumps, turbochargers, operator seats, diesel particulate filters, fuel injectors and engine thermostats.

Some additional components that are under consideration for scheduled maintenance beginning as soon as Fiscal Year 2008-2009 are slack adjusters, brake drums, brake chambers, and brake diaphragms.

Paratransit

There is not a scheduled predictive maintenance program currently in place for the LIFT fleet.

2.10 Unscheduled Maintenance

Fixed Route

Unscheduled maintenance is classified into four categories: Road calls, pullout repairs, operator reported defects, and yard repairs.

- Road call repairs: A disruption of service where another vehicle must be put into service to replace the disabled vehicle for mechanical or safety concerns.
- Pullout repairs: Problems with a vehicle, typically minor mechanical or safety issues, that are found by the operator that must be fixed before the vehicle is put into service.

- Operator reported defects: Problems with a vehicle that do not warrant a disruption of service and are mainly comfort, cosmetic, or minor mechanical issues.
- Field Repairs by Downtown Mechanics and Yard Repairs: Repairs done to the vehicle within the yard confines, typically for cosmetic issues or at fixed locations or transit centers.

All unscheduled maintenance is entered into the Maintenance Management Information System (MMIS) and corrective actions to remedy the problem are recorded. Those that are safety related or likely to result in a road call are repaired before being returned to service. Defects not falling into the above categories but not able to be repaired immediately are deferred and scheduled for further repairs at a later date. One indicator of Maintenance performance is the percentage of scheduled to unscheduled repairs. The performance goal for FY07-08 is to keep unscheduled maintenance at or below 30% of total repairs.

Paratransit

Unscheduled maintenance is identified on the fleet of LIFT vehicles: at the time of the operator's pre-trip inspection before pull-out, during service when a road call or vehicle tow is required, and in response to a written operator defect report submitted to Maintenance. These are treated the same as for fixed route, safety and maintenance related issues that do not allow for safe operation of a vehicle will be repaired before operation of the vehicle can continue.

2.11 Cleaning Program

Fixed Route

All fixed route buses receive two levels of cleaning. During the nightly service process, where buses are refueled and have their fluids checked, each interior is cleaned with a cyclone blower to remove dust, trash, etc., before being run through a wash rack for exterior cleaning. In addition, floors are mopped as needed but no less than once per week. Aluminum wheels are cleaned regularly but no less than once per week.

In addition, on a regular basis, interiors are held in for a deep, detailed interior cleaning where ceilings, walls, windows, and floors are washed. Every interior surface is hand cleaned. At present this is done about every 50 calendar days.

Our performance in this area is based upon customer complaints through our Customer Service Information (CSI) process. The goal is to have no more than two customer complaints at each garage for each month. This goal has been consistently met and/or exceeded for the last five years.

Paratransit

Cleaning of buses is part of the transportation providers contract. Operators daily sweep out buses and remove trash from vehicles. The transportation providers contract with a vendor who performs thorough interior cleaning and exterior cleaning.

2.12 Bus Maintenance Facilities

Fixed Route

Bus Maintenance is headquartered at 4413 SE 17th.Avenue, Portland, Oregon. TriMet has a total of 660 buses grouped into 18 fleets that represent different sizes, makes, and models of vehicles. Fleets consist of 30- and 40-foot buses and 24-foot mini-buses. Each bus is assigned to a garage — Center Street garage, Powell garage on the Eastside, or Merlo garage on the Westside. Buses start and end each service day and receive all necessary maintenance at their assigned garages.

Bodywork is performed at the Merlo garage in the body shop, which is equipped and staffed to repair accident damage, body defects, and paint. The Unit Rebuild group is located at Center Street and performs rebuild of various components such as transmissions, air/electric components, electronic components, steering gear boxes, hydraulic pumps, lift pistons, etc. In addition, buses are brought to this location to perform engine overhauls.

The bus fleet is domiciled and maintained at three operating divisions — Powell, Center, and Merlo garages. Table 2-6 shows when each facility was built.

Table 2-6. Opening Year Fixed Route Operating Bases

	Year Built
Powell	1976
Center	1980
Merlo	1984

TriMet Facilities Management maintains the bus garages. There is no deferred capital maintenance. Facilities Maintenance prioritizes capital maintenance as follows:

1. Structures (roof and envelope)
2. Major sub-systems (HVAC, hoists, plumbing)
3. Surface treatments and finishes (paint, concrete)

In 2004, TriMet Facilities Management commissioned a building assessment. The purpose of the study was to identify capital building maintenance to be done in the next five years.

The building assessment found no deferred maintenance. It recommended that TriMet budget for three major cost items through 2009.

The following table lists those items and what years they are included in the CIP and Financial Forecast.

Table 2-7. Major Facilities Capital Maintenance

	Year
Merlo roof	2009
Hoist repair - all garages	2005-2009
Merlo Report roof and HVAC	2006

The financial forecast includes needed replacements identified above.

2.13 Maintenance Facility – Paratransit

LIFT maintenance is located at 2800 NW Nela Street, Portland, OR. All maintenance, save light repairs (headlights, taillights, wiper arms and blades, adding of washer fluid, topping off engine/transmission fluid, etc.) is done at the Nela facility. Buses are transferred from their operating base to Nela for necessary preventive maintenance and repairs. Body damage repairs are done by outside contractors. LIFT maintenance has 11 bus bays, five equipped with lifts in the 24,000 square foot facility.

The LIFT fleet is domiciled at three facilities—Nela, 2025 SW Merlo Court, Beaverton, OR (Merlo LIFT) and 3705 SE 99th Avenue, Portland, OR (Powell LIFT). All fleet sites and both the Nela and Powell office buildings are TriMet-owned. The Merlo LIFT office is currently leased and plans are underway to build an office on TriMet property adjacent the fleet parking lot. There are 99 vehicles operating out of the Powell LIFT facility, 97 operating out of NW Nela and 73 operating out of Merlo LIFT.

All scheduled maintenance and most repair work on LIFT vehicles is performed at LIFT central maintenance, located at the NW Nela facility in Portland, OR, the exception being body repairs done by outside contractors. Table 2-8 shows when each facility was built:

Table 2-8. Opening Year LIFT Operating Bases

	Year
Nela	1997
Merlo LIFT	2003
Powell LIFT	2003

This page left blank intentionally.

3. Fleet and Fleet Management

3.1 Quality of Service – Fixed Route and Paratransit (note: Safety and Security info below applies also to LIFT)

High quality transportation is a key element to the TriMet system. Safe, frequent, reliable and comfortable service on modern vehicles is fundamental to improving service quality and attracting new riders. TriMet will maintain and improve the quality of its transit service as described below.

Safety and Security

Ensuring safe operation of transit service and safe design of transit facilities and equipment is embedded into all TriMet activities. Similarly, all TriMet employees serve as “eyes and ears” for security awareness.

- Procurements and construction of new buses, light rail vehicles, and facilities include safety requirements in design and performance specifications, which are verified in design reviews and testing. Safety hazards are formally identified, assessed, and resolved as part of developing specifications and designs. Acceptance testing against safety-related design and performance requirements is formally performed and documented. Certification that all safety design requirements have been met, as well as the following operational safety requirements, is required before completed facilities and equipment are placed into passenger service. Standard Operating Procedures (SOPs) govern all operations, to assure safety and quality.
- Safety training for employees is formal and documented, specific both to job classification and the specific equipment or facility involved.
- Emergency response drills are conducted drilled periodically.
- Every accident is analyzed for preventability, with lessons learned implemented by improvements to procedures, training, or equipment, as appropriate.
- Safety audits are performed on an ongoing basis, and the Federal Transit Administration (FTA) performs safety program oversight.

Security programs include:

- All TriMet employees serve as “eyes and ears” for security awareness and reporting.
- Security procedures assure rapid and assured communication and response to a reported security situation. TriMet’s operations command center works closely with 9-1-1 dispatch centers to assure the fastest possible police or emergency response.
- TriMet buses and trains have security cameras on-board, and public telephones installed at MAX platforms and near high-use bus stops enable customers to call 9-1-1.

- Transit Police Division officers, contracted Transit Security Officers, Rider Advocates (in North/Northeast neighborhoods), and Fare Inspectors patrol the TriMet system. TriMet has increased these dedicated personnel by 18 percent from 2002 to 2004.
- TriMet receives information about homeland security threats potentially affecting the transit system through the Transit Police Division and other sources, and takes appropriate action. Since 2001, TriMet has adopted transit agency best practices and training related to domestic security, which all operating personnel have been trained on. TriMet continually monitors emerging trends in mass transit security and homeland security.

Riders can play an important role in maintaining system safety and security, by reporting potentially unsafe or threatening situations to TriMet staff. In 2004, TriMet introduced new security signage, brochures, channel cards, and Transit Tracker notices encouraging heightened passenger awareness.

All LIFT and fixed route vehicles are equipped with TriMet's Bus Dispatch System (BDS), which was installed in 1997. BDS capabilities include voice and data communications, automated vehicle location, and covert alarms, allowing safety and security issues to receive immediate attention from dispatchers, and emergency personnel.

Frequency and Levels of Service

Service frequencies often reflect the demand for service, however TriMet understands the importance of frequency as it applies to quality of service. Frequent service (throughout the day) contributes to ridership in several ways:

- It reduces actual and, even more substantially, perceived travel time by transit.
- It makes the need to transfer less onerous. Given contemporary multi-destination travel patterns, TriMet cannot connect all the origins and destinations with direct service. If the transfer wait time is short and the transfer environment is good, customers will be much more willing to transfer.
- It makes transit more attractive for short trips. Most trips by automobile are short, so it is important for transit to attract these trips in order to increase ridership and meet 2040 goals, particularly on transit ridership to Regional and Town Centers and along Main Streets.
- It makes transit convenient, an essential element in attracting more trips.

<u>As stated, frequency and levels of service are reflective of demand. This is especially true during peak-periods, when efficient deployment of resources is essential. Peak-only and express bus service is provided between 7:00 a.m. and 8:30 a.m. and 4:00 p.m. and 6:00 p.m. on weekdays.</u> Though frequent service routes operate all day, service frequencies on these routes increase during these periods to also meet the higher demand for service. TriMet service in general is available between the 4:00 a.m. and 2:00 a.m. on weekdays and the span of service for weekends is generally from 4:30 a.m. to 1:30 a.m. with no peak periods.

Automated Stop Announcements

Computerized "Automated Stop Announcements" (ASA) are installed on all existing low-floor buses and planned for all newly procured low-floor buses. Beyond assisting TriMet in assuring that the ADA requirements for announcing transit stops are fully complied with, the ASA will improve service quality for all transit riders. ADA requires that stops be internally announced for transfer points, major intersections, destination points, requested stops, and externally announced for the route and destination for customers waiting at stops served by multiple lines.

TriMet's ASA system includes internal and external audio announcements, and an internal readerboard display of stops. TriMet's ASA project staff has continually consulted with the "Committee on Accessible Transportation" (CAT), other disability organizations, and TriMet bus operators in development of the system. The system is configurable to adjust features such as what is announced, audio volume, etc., based on feedback from bus operators and riders.

TriMet began making ASA external route and destination announcements in December 2006, and internal stop announcements in December 2007, for a few selected routes. TriMet is in the early stages of internal stop announcements, and is gradually turning on specific routes after the announcement data has been extensively reviewed and tested.

TriMet is currently reviewing the plan for retrofit of ASA on to our older high-floor buses.

Modern Vehicles

TriMet's newest buses have low floors that make it easier for all riders to get on and off, especially elderly individuals and persons with mobility devices. New buses are also air-conditioned, and have lower emissions than our older vehicles. Future bus orders will include automated stop announcement equipment as well. New light rail cars will continue to be of low-floor design and will feature additional seating compared to existing MAX vehicles.

The following criteria are used to recommend lines for expanded use of low-floor buses:

- Weekly ridership on the route is the primary factor used when determining where to place low-floor buses because the higher the ridership the more customers benefit from air-conditioning and quicker boarding.
- Weekly boardings by honored citizens (elderly customers or people with disabilities) who especially benefit from not having to climb steps to board the bus.
- Weekly boarding rides that require the use of the lift.
- Running the lower-emission buses in neighborhoods with high existing levels of diesel emissions or on the Portland Mall.

3.2 Reliability

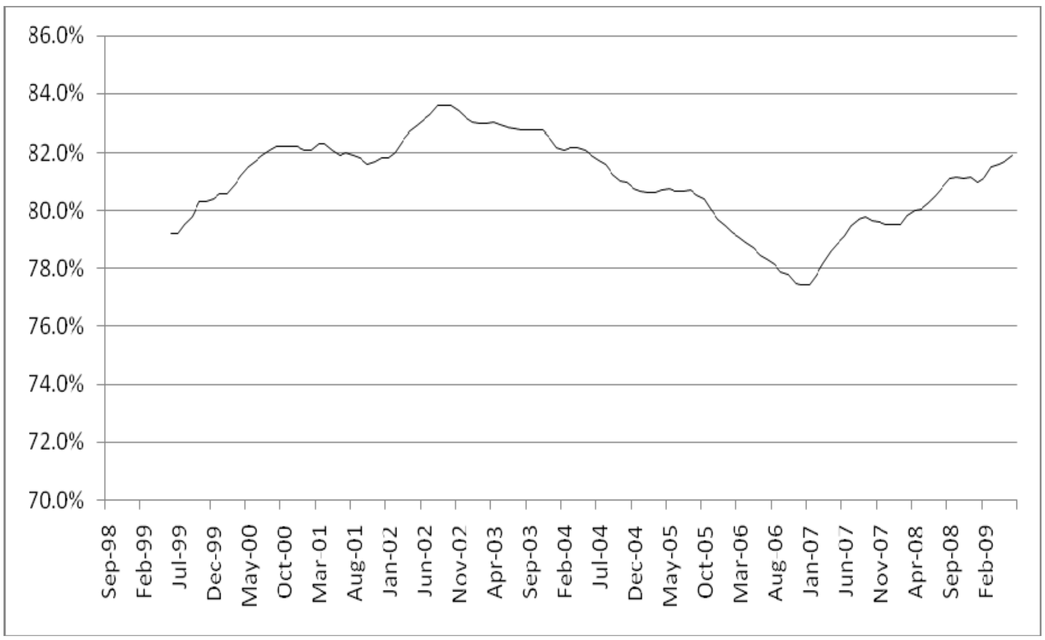
TriMet's market research shows that transit service must be reliable in order to be a viable alternative transportation choice. This is achieved by writing accurate schedules; minimizing the time buses are delayed by traffic congestion; efficient boarding and fare payment systems; proper training and supervision of drivers; and restoring service promptly after a disruption.

3.2.1 On-Time Performance

Fixed Route

A bus or train is considered on time if it arrives no more than one minute early or five minutes later than its scheduled arrival time. Information on bus and train arrival times is continually collected and summarized each quarter. The goal is for at least 90 percent of all bus trips and 95 percent of MAX trips to arrive at timepoints on time during an average weekday, Saturday, or Sunday.

Figure 3-1. Bus (weekday) On-Time Performance by Month (1998-2009)



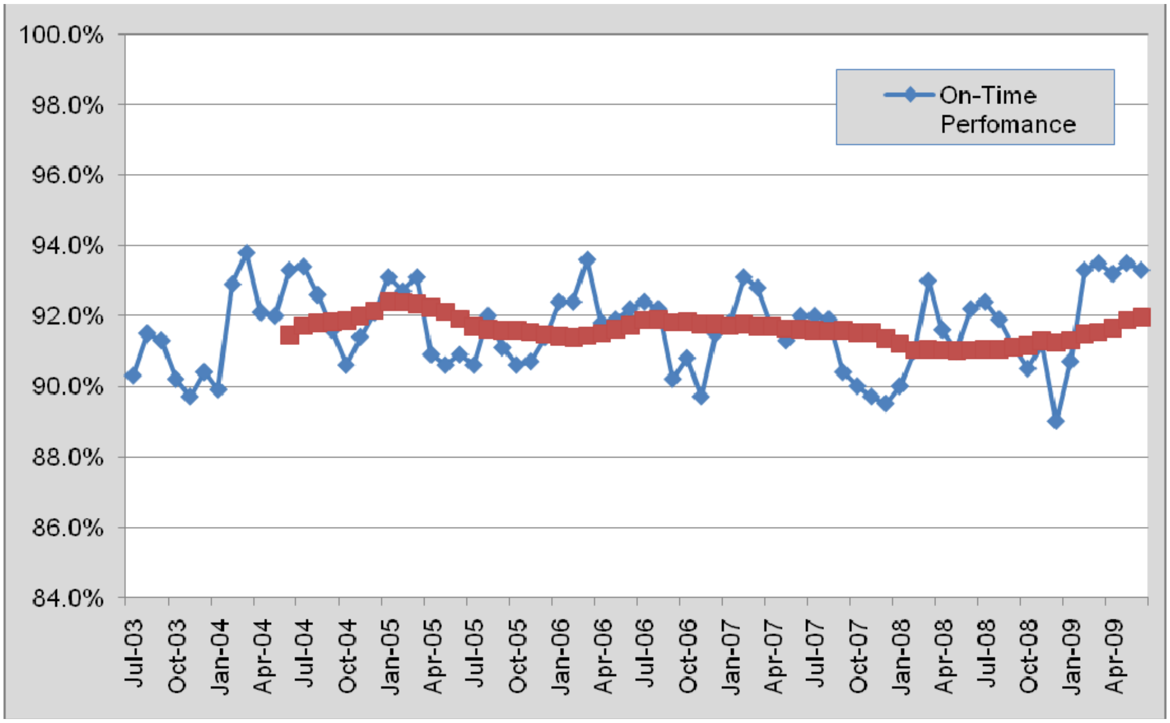
Changes in bus system on-time performance in Figure 3-1 can be explained partially by the implementation of new operational technology such the Bus Dispatch System (Fall 1999) or a comprehensive effort by operations management to address runtime and schedule adherence issues brought forward by bus operators (Winter 2007 - present).

TriMet modifies bus schedules and routes to maximize service productivity. Ridership is also a measure of how efficient and productive bus service is.

Paratransit

A LIFT route is considered on time if it arrives no more than 30 minutes after the start of the scheduled pickup window. The goal is for at least 90 percent of all pickups to be within the 30-minute window.

Figure 3-2. LIFT On-Time Performance by Month (FY04 - FY09)



In addition to on-time performance for pickups, LIFT also tracks on-time performance for customer appointments, and time on board the vehicle. These performance indicators, and complaint data for LIFT service, is reported quarterly to TriMet's advisory committee, CAT.

3.2.2 On-Street Improvements

Traffic preferential improvements along roadways that help improve the reliability of bus service include:

- Signal priority
- Jump lanes at intersections
- Bus stops with curb extensions
- Management and route design measures to reduce run times and improve reliability

Signal modifications and track layout changes are used to increase reliability of train operations as the rail network expansion involves more merges and higher train volumes.

3.2.3 Technological Applications

TriMet uses advancements in transit technology to track and improve the reliability of service. In addition to the use of automatic passenger counters (APC) at bus doors to collect ridership information, TriMet implemented the bus dispatch system (BDS) in 1997. This allows TriMet to track buses via satellite and, when combined with APC data, provides a powerful tool for analyzing service.

3.3 Service Delays – Fixed Route and Paratransit

3.3.1 Maintaining Service Reliability: In-Service Failures

Fixed Route

Close attention is paid to service delays due to mechanical failures. Using our PIP (Productivity Improvement Process), mechanics continually identify specific components that resulted in an inordinate number of roadcalls. Each component is then analyzed to determine the best way to reduce unscheduled failures and if a predictive maintenance procedure can be applied. Each of these problem components would then be changed at a predetermined mileage designed to reduce unscheduled replacements by 95%.

In addition, mobile service trucks are available at three service locations in east, west, and the downtown regions of our service district. Each truck is on duty, staffed, and outfitted with commonly used parts during the AM and PM peaks. This has reduced the need for operators to roadcall a bus to make what would ordinarily be a very minor repair, i.e., headlight, wiper blade, mirror, etc.

Paratransit

As in fixed route, TriMet and its contractor for LIFT maintenance, Penske Truck Leasing, monitor roadcall mileage very closely. One of the primary measures of contract effectiveness is roadcall mileage, as the contract mandates no less than 25,000 miles between chargeable roadcalls for the LIFT fleet.

All of the above is predicated on rigorous attention to comprehensive PM procedures and on time performance. TriMet has a goal of 95% on time performance of its PMs and has met that goal for a number of years, often exceeding it.

3.3.2 Miles Between Road Calls

Fixed Route

Fleet reliability is measured in miles between road calls. This mileage has increased significantly over the past five years as preventive maintenance schedules have been completed more than 95% on time and frontline employees have taken an active role in preventing the problems that cause road call vehicles. In addition to preventive maintenance, the Maintenance department is now pursuing predictive maintenance where high profile components are replaced on a schedule determined by historical failures.

Road calls are applicable to 30- and 40-foot buses and are divided into three categories:

- <u>Chargeable road calls</u> are defined as road calls due to a mechanical failure.
- <u>Non-chargeable road calls</u> are defined as road calls caused by non-mechanical issues.

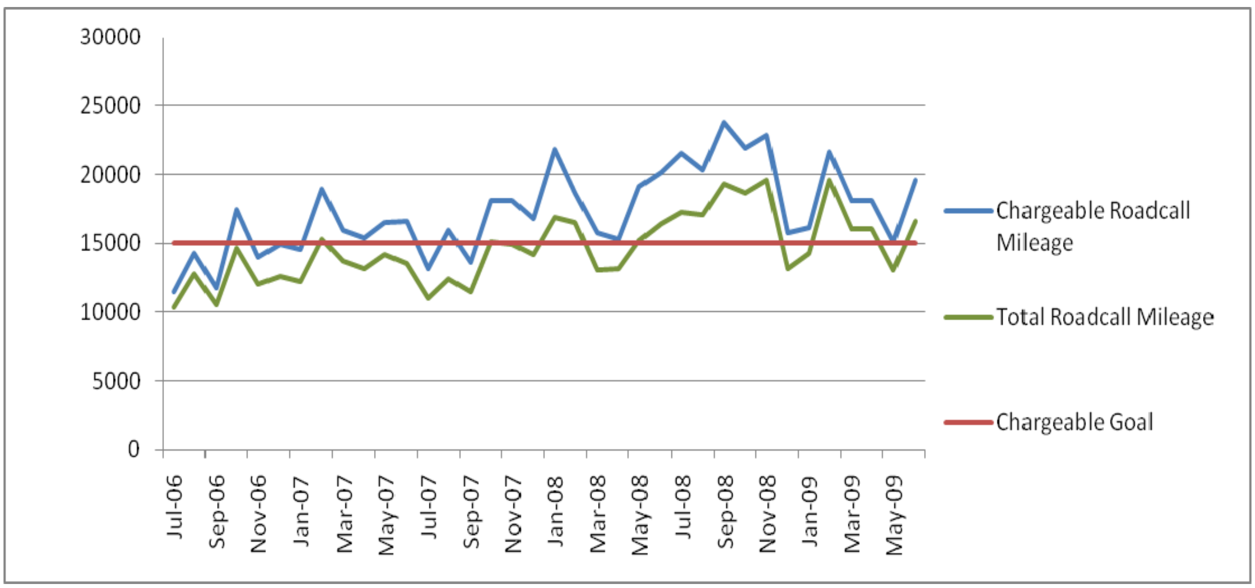
- Total road calls are defined as the combination of both chargeable and nonchargeable road calls.

Chargeable road calls are the basis for performance goals of the department. For FY07-08 one of the performance goals for the department is to maintain miles between chargeable road calls above 15,000 miles. The following tables illustrate road call performance for chargeable road calls for the past five years and last complete fiscal year performance for both chargeable and total road calls.

Table 3-1. Chargeable Road Call Performance History

Period	Goal	Actual Performance
FY 01	7,000 MBRC	7,687 MBRC
FY 02	7,000 MBRC	7,869 MBRC
FY 03	8,000 MBRC	7,388 MBRC
FY 04	9,000 MBRC	9,751 MBRC
FY 05	9,500 MBRC	12,881 MBRC
FY 06	11,500 MBRC	13,341 MBRC
FY 07	14,000 MBRC	16,679 MBRC
FY 08	15,000 MBRC	18,063 MBRC
FY 09	15,000 MBRC	17,395 MBRC

Figure 3-3. FY06-07 Annual Road Call Mileage - Fixed Route



**The Goal is only effective for the Chargeable Roadcall Mileage. Total Roadcall Mileage factors in Non-Chargeable Roadcalls that we have no control over.*

Paratransit

LIFT service operates with 75,000 miles between roadcalls, exceeding the contract goal of 25,000 miles between roadcalls.

This page left blank intentionally.

4. Schedule and Ridership

4.1 Schedule Design – Fixed Route

TriMet service is designed to meet ridership demands while maintaining a high level of service efficiency. An important component to maintaining this efficiency is in designing service schedules to meet the varying demand levels for service throughout the day. The basic variable that gives service planners this flexibility is altering service headways throughout the day. However other variables such as span of service, inter-lining bus trips, and offering peak-only service can improve the efficiency of service on the street.

Span of Service

Regular TriMet service is available between the 4:00 a.m. and 2:00 a.m. on weekdays. Peak periods on these days are experienced between 7:00 a.m. and 8:30 a.m. and 4:00 p.m. and 6:00 p.m. The span of service for weekends is generally from 4:30 a.m. to 1:30 a.m. with no peak periods.

Frequency

As mentioned in Section 3 the frequency of service, or service headway, is a large component of service quality. Service frequency is also a significant component in the schedule design of TriMet's bus system. Bus service is generally categorized as regular service, frequent service, and peak-only service. All routes operate during peak periods (6:30-8:30 a.m., 4:00-6:00 p.m.), when the demand for service is high. Frequent Service routes operate all day and offer 15-minute (or better) service headways from 6:00 a.m. to 9:00 p.m. General TriMet service is available from 4:00 a.m. to 2:00 a.m.

Table 4-1. Bus Service Frequency

Category	Span of Service	Routes (% of all routes)
Frequent service	Service at least every 15 min throughout the day (6am to 9pm)	12 (15%)
Regular service	All day service (4:00am to 2:00am)	49 (61%) excludes Freq Svc
Peak-only service	6:30 a.m. to 8:30a.m. 4:00 p.m. to 6:00 p.m.	20 (25%)

TriMet's bases future service changes on its Transit Investment Plan (TIP). The TIP is a rolling five-year plan that is updated annually. More information on the TIP is included in Section 5.

4.2 Route Performance Monitoring – Fixed Route

TriMet has established a process to identify low-performing lines and to either improve ridership or discontinue the route in order to improve service to other lines with greater need. The first step is to ensure that riders, local jurisdictions, and other interested parties are invited to participate in the review of a route's performance. The initial focus is to find ways to increase ridership. This could be achieved by restructuring the service, adding more service, improving bus stops or access to them, implementing programs to increase demand, undertaking promotional campaigns, or targeting service to new developments along the line. A strategy is then developed and implemented on a trial basis.

Generally, lines are given a year or more to reach an acceptable ridership productivity level. If that level is not achieved, the service may be reallocated to other lines that need more capacity. TriMet will look first to reallocate the service within the same community. TriMet will provide some form of safety net service for those riders who have special needs, particularly seniors and people with disabilities.

Fixed route bus lines have a desired minimum of 15 boarding rides per vehicle hour and a maximum operating cost of $5.00 per boarding ride. The operating cost per ride guideline is roughly twice the bus system average, $2.43. Lines that do not attract at least 10 boarding rides per vehicle hour are low performing lines that should be addressed to improve productivity.

Table 4-2 lists present low performing and marginally performing lines and line segments. As a whole, these account for 4 percent of weekly bus system vehicle hours, 1.6 percent of boarding rides and 4.5 percent of peak buses.

Table 4-2. FY09 Marginal and Low Performing Lines (<15 BR/VH)

Route	Weekly BR	Weekly Vh	BR/VH	Cost/BR
187 - Alderwood Loop	150	22.5	6.7	$ 14.24
153 - South End Rd Loop	350	48.2	7.3	$ 13.07
84 - Kelso / Boring	200	27.5	7.3	$ 13.04
36 - South Shore	1,150	126.3	9.1	$ 10.43
27 - Market / Main	650	67.4	9.6	$ 9.85
60 - Leahy Road	250	24.6	10.2	$ 9.34
18 - Hillside	350	31.8	11.0	$ 8.61
55 - Hamilton	850	75.3	11.3	$ 8.42
157 - Happy Valley	670	58.0	11.6	$ 8.22
37 - Lake Grove	750	63.2	11.9	$ 8.00
156 - Mather Road	1,410	118.7	11.9	$ 8.00
43 - Taylors Ferry Rd	4,120	344.8	12.0	$ 7.95
154 - Willamette	550	42.2	13.0	$ 7.28
16 - Front Ave / St Johns	2,250	166.2	13.5	$ 7.01
59 - Walker / Park Way	1,450	105.2	13.8	$ 6.89
38 - Boones Ferry Rd	1,750	125.9	13.9	$ 6.83
34 - River Road	1,710	118.8	14.4	$ 6.59
128 - Linwood	950	65.2	14.6	$ 6.52
63 - Washington Park	1,180	80.9	14.6	$ 6.51
39 - Lewis & Clark	1,190	81.1	14.7	$ 6.47
Notes:				
FY 09 Bus operating cost/VH (12 mo. avg):	$ 94.95			
FY 09 Bus system average cost/BR (12 mo. avg):	$ 2.89			
Avg. weekly boarding rides excludes Summer quarter				

Since September 2000, approximately 3 percent of weekly vehicle hours and 39 peak buses have been reallocated or saved by addressing low performing lines and service productivity.

TriMet also modifies bus schedules and routes to manage capacity and maximize service productivity. Productivity is measured as the portion of time that buses spend serving passengers (revenue hours) compared to the total time that buses are out of the bus yard (vehicle hours). Vehicle hours include revenue hours, time between ends of lines and the garages (deadhead hours), and schedule recovery/operator break times during the day (layover hours). Productivity enhancements balance layover hours to provide schedule recovery time when and where it is most needed. This increases the overall usefulness of transit service by reallocating service (lines and parts of routes) with low ridership to lines with higher ridership potential. Allocation of service to meet customer demand is important for ensuring adequate frequency and availability of seats.

Table 4-3. Bus Schedule Efficiency (RH/VH)

	Revenue Hours	Vehicle Hours	Efficiency
June-02	122,141	166,439	73.38%
June-03	124,879	168,110	74.28%
June-04	128,516	171,803	74.80%
June-05	123,758	166,260	74.44%
June-06	123,673	165,237	74.85%
June-07	123,166	162,485	75.80%
June-07	123,166	162,485	75.80%
June-08	125,505	164,039	76.51%
June-09	129,982	169,745	76.57%

Source: Monthly Performance Report

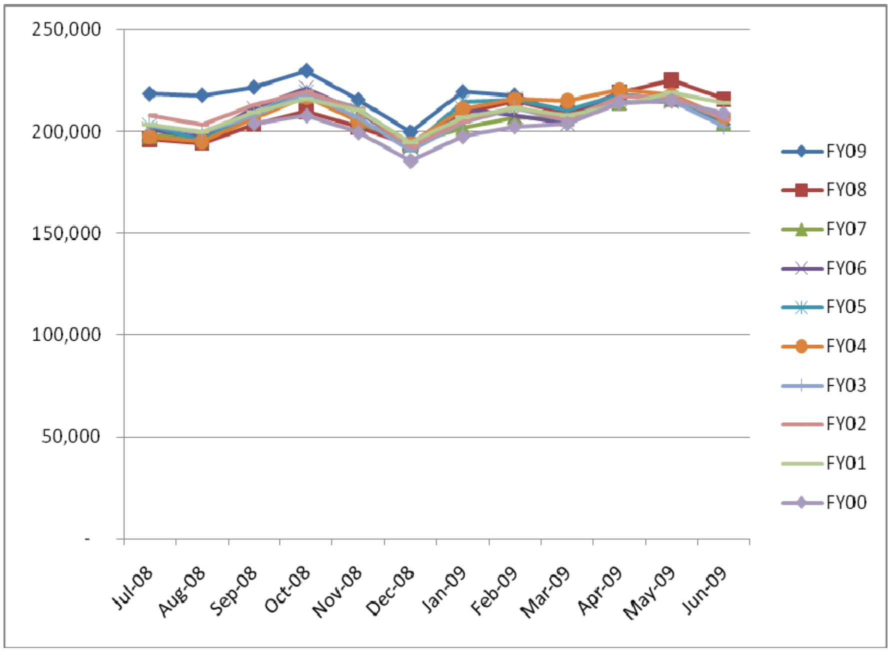
TriMet improves internal operations to ensure that buses and trains leave the end of the line on time, that schedules reflect realistic running times, provide balanced layover times, and that service disruptions are addressed quickly. Efforts are also underway to work with operators and other field personnel to improve on-time performance and operating conditions, and adjust run times when appropriate.

4.3 Ridership – Fixed Route

Fixed Route

TriMet's annual ridership has increased every year since FY1988 but one (FY2006). Ridership growth reflects the investments TriMet has made in improving service, especially on Sundays. The portion of weekday riders served by Frequent Service increased from 17 percent in 1998 to 57 percent (for FY2009). All of the net bus system ridership growth since FY1999 has been on Frequent Service lines. Overall, TriMet ridership is increasing faster than other indicators of regional growth, including population and automobile vehicle miles traveled.

Figure 4-1. Fixed Route Ridership FY02-FY09



4.4 Passenger Load Standards – Fixed Route

TriMet's service standards list acceptable passenger capacities for different vehicles. These standards encourage ridership by preventing passenger overcrowding and ensuring that everyone has a comfortable ride. Alleviating crowding can require greater capital and operating resources for more buses and trains, operators, mechanics, supervisory personnel, and equipment.

Table 4-4. Achievable Passenger Capacities per Fixed Route Vehicle

Type of Vehicle	Passenger Capacities (Average during peak one hour in peak direction of travel)		
	Seated	Standing	Total
30-Foot Bus	28	2	30
40-Foot Bus	39	12	51

Load Factor Evaluation – Fixed Route

Ridership information is collected daily from APCs at bus doors. Approximately 83 percent of TriMet's bus fleet is APC-equipped. Ridership summaries are prepared quarterly to determine if passenger overcrowding is occurring or is projected to occur within the next year. The counters on buses and railcars provide monthly ridership counts, peak load checks, and data for the National Transit Database and information for service adjustments. TriMet's passenger loading standards are used to determine if a bus or train is overcrowded.

4.5 Factors Influencing Peak Period Ridership – Fixed Route

Demand for service is greatest on weekday mornings and afternoons. However special events can influence peak period ridership as well, especially when they occur during the pm peak, when TriMet experiences its greatest demand for service. Sporting events are a common reason to deploy contingency buses to meet high ridership demands. Special events such as these occur on an average two to three times a year and can require as many as 10 contingency buses to accommodate the increased demand for service. Efforts are made to balance the deployment of operators and vehicles among all three garages when possible.

Increases in service productivity help offset the need for more buses in the afternoon peak. Overall TriMet projects no net increase of buses through June 2012.

Table 4-5. Fixed Route Buses in Service

\	Weekday					
	6 a.m.- 10 a.m.	10 a.m.- 4 p.m.	4 p.m.- 8:45 p.m.	8:45 p.m.		
Qtr	Am Pk	Midday	Pm Pk	Evening	Sat	Sun
Jun-02	527	316	561	205	275	197
Jun-03	521	315	552	205	276	198
Jun-04	510	315	541	201	271	204
Jun-05	492	308	525	198	265	204
Jun-06	492	305	526	195	268	206
Jun-07	480	307	529	not available	269	205
Jun-08	488	311	528	not available	274	217
Jun-09	496	310	525	not available	268	221
Jun-10			525			
Jun-11			528			
Jun-12			531			
Jun-13			534			

Notes:
Beginning with Sept-02, does not include two vans assigned to Cedar Mill service during peak periods (Line 42). Beginning with June-03, does not include two wkday and three wknd buses on Washington Park Shuttle (Line 73). Blue Lake Shuttle not included (summer only). No buses required (or saved) for construction reroutes are included in this data.
Sept-00 represents the historic peak for bus pullouts.

Peak pullouts are projected based on existing service needs and planned service changes. Projecting peak pullouts assists the agency with planning for future bus purchases and fleet retirement. The required fleet figure in Table 4-6 is calculated by multiplying peak pullouts by the agency spare ratio. Over one-half of all TriMet buses are now low-floor vehicles and are equipped with APCs. All buses are now ASA–equipped.

Table 4-6. TriMet Fixed Route Fleet FY2003-2013

	FY09	FY10 PLAN	FY11 PLAN	FY12 PLAN	FY13 PLAN	Change 2009-2013
Standard Low Floor	361	361	403	446	488	127
Standard High Floor	262	262	220	180	140	-122
Current Fleet Plan	623	623	623	626	628	5
Required Fleet (spare ratio x pk pullouts)	609	609	609	611	615	6
Contingency Buses	14	15	15	15	15	1
Peak pullouts*	525	525	525	527	530	5
Spare ratio	16%	16%	16%	16%	16%	0%
						Total
Bus Purchases	40		42	43	42	167
Percent low floor (% of Current Fleet)	58%	58%	65%	71%	78%	
APC Equipped (% of Current Fleet)	100%	100%	100%	100%	100%	
ASA Equipped (% of Current Fleet)	59%	59%	66%	73%	79%	
Service Assumptions:						
Passenger crowding				1	2	3
Reliability				1	2	3
Service productivity					-1	-1
Line 5 Interstate						0
Interstate local area (JARC)						0
Frequent Service						0
Division Frequent						0
TV Hwy Frequent						0
Hall Frequent						0
King Road Frequent						0
Tigard local area						0
Molalla Ave						0
Other						0
Line 4- St. Johns Extension						0
Sellwood Bridge Weight Limits	-2					-2
30' Bus Reblocking						0
Line 6 end at Jantzen Beach						0
Sunnyside						0
Restore Line 71 schedule	-3					-3
I-205 - Mall						0
TOTAL	-5	0	0	2	3	0

Notes:

Figures do not include Washington Park Shuttle (summer only) or Cedar Mill Shuttle (2 van pullouts)
Also excluded from this data are any buses required for temporary construction reroutes.
**Note: Starting point is 560 fixed route peak pullouts in 9/02 and 656 buses in active fleet.*

4.6 ADA Paratransit

TriMet has provided demand responsive transportation services through the LIFT Program to people with disabilities since 1976, fifteen years before passages of the Americans with Disabilities Act (ADA) mandated the service. The LIFT Program is a shared-ride, public transportation service for people who are unable to use fixed route buses or MAX due to a disability or disabling health condition. LIFT operates during the same hours as bus and MAX services, generally 4:30-2:30 a.m., seven days a week. The boundary of the LIFT service area is three-fourths of a mile from the outermost portions of TriMet's bus and MAX lines and includes all locations inside that boundary, except for areas that are not part of the TriMet service district. All rides are by advance reservation only and must be requested no later than 5 p.m. the day before the trip. The LIFT Program operates door-to-door and curb-to-curb service, according to service standards that exceed or are equal to the standards established by the ADA.

LIFT service fares are $1.80 one-way. A book of 10 tickets costs $18.00, a 20-Trip Punch Card costs $36.00 and a LIFT Monthly Pass is available for $50.00.

Six contractors - four transportation providers, a dispatch contractor and a maintenance contractor, provide LIFT services.

LIFT performance is measured against the following goals:

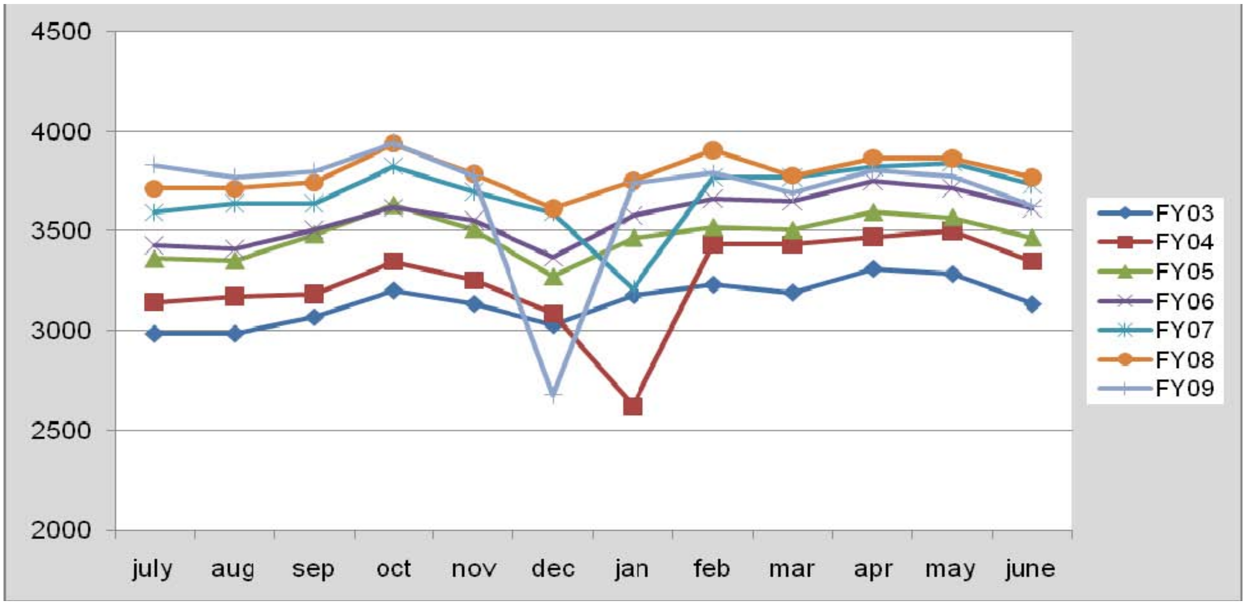
- LIFT On-Time Performance (percent of vehicle arrivals for customer pickup within 30 minutes of scheduled pickup) >= 90%.
- Monthly Rides per Vehicle Hour >=2.0
- Operating Cost per Vehicle Hour <=$28.90 (excludes maintenance costs).
- LIFT Miles/Chargeable Roadcall >=75,000
- LIFT Miles/Vehicle Accident >=95,000
- LIFT Complaints per 1000 Rides <= 3.0

In FY08-09, the LIFT program met or exceeded all these goals except for the rides per hour goal, which was 15% lower.

Operating costs of the LIFT service have increased 482% since FY92 when the Americans with Disabilities Act became law and 130% since FY00. Ridership has increased 165% since 1992 and 48% since FY00. The cost of a one-way ride on LIFT is now about $29. TriMet's LIFT costs have been in line with the national average.

TriMet, like many transit agencies throughout the country, struggles to meet the demand for ADA complementary paratransit services. LIFT vehicle hours, program costs and ridership have nearly tripled since 1992 when the ADA became law and continue to grow at rates greater than fixed route.

Figure 4-2. LIFT Average Weekday Rides FY03-FY09



LIFT Ridership is projected to grow at an average rate of 1.5% per year over the next 10 years.

In response to the combined pressures of increasing ridership demand, customer demands for service quality improvements and limited funding, TriMet, the three counties, Ride Connection and consumer groups in the region are working together to improve mobility for persons with disabilities through cost efficient, innovative services, marketing fixed route as a transportation preference and a variety of fixed route travel training programs.

The comprehensive approach includes the following programs:

1. An Improved Fixed Route Foundation
    - Disability Awareness and Sensitivity Training for fixed route operators.
    - Ride Wise, a partnership between TriMet, Ride Connection, and other organizations includes intake and referral services, fixed route travel training, a "train the trainer" program, consumer education and outreach, fixed route familiarization, specialized one-on-one training, and a peer trainer program. Program began November 2004.

2. LIFT Eligibility Process improvements
    - TriMet is currently developing a centralized transit mobility center to perform in-person evaluation of a LIFT applicant's functional abilities to determine the most appropriate mode of travel and educate customers on the services available to them based on their abilities.

3. Innovative Services for LIFT-eligible Riders
   - Shopper Shuttles
   - Local community-based services (North/Northeast RideAbout service began May 2004)
   - Coordination with the private non-profit transportation network

Organizations that have taken this approach have been able to slow the growth of expensive door-to-door services.

TriMet is projecting the need for an additional 3-7 LIFT vehicles a year over the next ten years to meet peak LIFT ridership demand. These costs are included in the agency's financial forecast.

Figure 4-3. LIFT Annual Ridership FY07-FY21

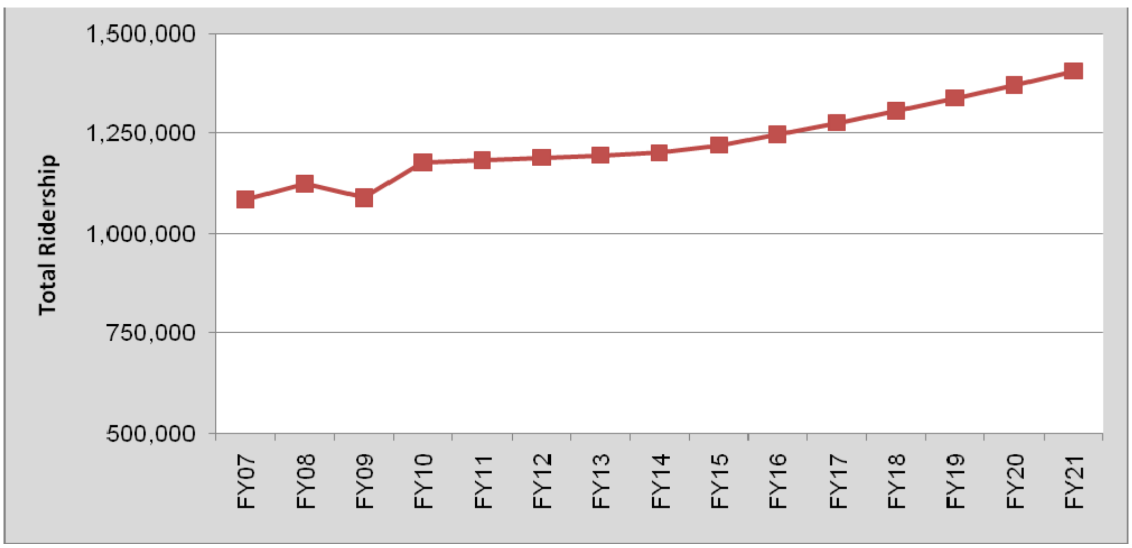


Table 4-7. Three-Year History and a Projection of LIFT Vehicle Needs through 2012

Year	Peak Vehicles	Total
1999	136	163
2000	145	174
2001	165	187
2002	173	193
2003	172	203
2004	185	210
2005	195	226
2006	204	236
2007	213	246
2008	221	259
2009	232	269
2010	235	273
2011	236	274
2012	237	275

5. Future System

TriMet's TIP provides a framework for how transit investments will be made in the Portland region. It outlines where transit will grow in the future and establishes the priorities for where TriMet will expand bus service. The growth and expansion of the TriMet system has obvious implications on its bus fleet.

Washington County Commuter Rail

The Washington County Commuter Rail line, known as the Westside Express Service (WES), between Beaverton and Wilsonville opened in February 2009. Track along the full length of this shared rail line was reconditioned in the fall of 2006, with intersections, special trackwork, and stations following in 2007 and 2008.

Population in the commuter rail corridor is forecast to increase by more than 45 percent by 2020, with employment expected to increase by more than 88 percent during the same period. Regional plans identify over 29,000 new homes and apartments and 65,000 new jobs in the corridor cities by 2017. This new line will offer a new transportation choice that avoids highway congestion within the heavily traveled Interstate 5 and Highway 217 corridor, connecting TriMet MAX Light Rail in Beaverton with destinations such as Washington Square Regional Center, Tigard, Tualatin, and Wilsonville.

Pedestrian access and bus transfers along this line were reviewed to consider connections to WES rail service (see Section 5-2). Specific planning activities included:

- Reorientation of bus services around the Beaverton Transit Center
- Refinement of bus and pedestrian access at the Hall/Nimbus station in Washington Square Regional Center
- Pedestrian access, streetscape, and transit-oriented development opportunities at the Tigard station
- Managing anticipated park-and-ride demand and finalizing plans for bus service connections at the Tualatin station.

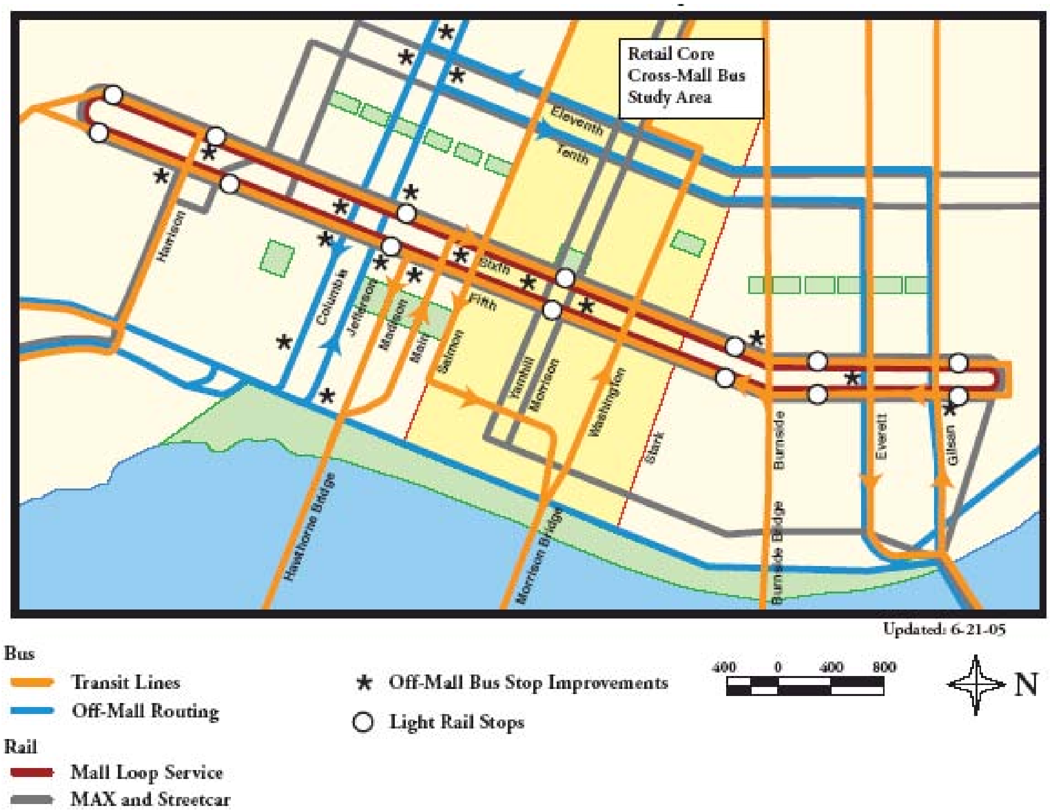
South Corridor I-205 / Portland Mall Light Rail Project

The South Corridor I-205/Portland Mall Light Rail Project is constructing 8.3 miles of light rail in two segments, with 15 new stations and approximately 2,300 additional park-and-ride spaces. This new MAX Green Line, opening in September 2009, will operate along 6.5 miles of rail adjacent to I-205 between Clackamas Town Center transit center (TC) and Gateway TC, serve existing stations between Gateway and Rose Quarter TC, and then use new track on the Portland Mall between Union Station and Portland State University. Three miles of the I-205 extension will be on a grade-separated alignment that was reserved and graded as a transitway when the freeway was originally constructed, reducing project costs and minimizing impacts. Eight new stations will serve the I-205 segment and provide 2,200 park-and-ride spaces. Eleven bus routes will connect with the Green Line at the Clackamas Town Center terminus station.

In downtown Portland, 1.8 miles of new track on 5th and 6th Avenues are under construction, serving seven stations from Union Station at the base of the Steel Bridge to Portland State University. The north-south MAX alignment in downtown connects Portland State University, the single largest transit-trip generator in TriMet's district, to the light rail system, and provides circulator service along the spine of downtown to allow better mobility for those traveling within downtown. Local circulator trains will fill service gaps along the transit mall.

The design of the Portland Mall was a focused effort to accommodate a lane of general-purpose traffic alongside two lanes for integrated bus and light rail operation. The revitalized Portland Mall will include streetscape improvements, public art and upgraded bus shelters that will be inviting for businesses, pedestrians, and civic activities.

Figure 5-1. Downtown Service Concept



5.1 Expanding Fixed Route (Bus) Service

Investments in Frequent Service would both expand the number of Frequent Service lines and add more service to existing lines in the early morning and evening. Table 5-1 identifies planned Frequent Service improvements that will help achieve the Regional Transportation Plan's 20-year strategy for transit.

Two new Frequent Service lines and three span-of-service increases to existing Frequent Service lines have been identified as top-tier priorities as funding for operations and bus fleet expansion becomes available. The cost to upgrade service is measured by peak buses added and additional weekly vehicle hours required ($94.95/VH in FY09). Table 5-1 illustrates the locations of these Tier 1 Priority expansions within the context of existing Frequent and Regular Service. A more in-depth description of each of these expansions then follows.

Table 5-1. Frequent Service Expansion Priority

Type	Line	From	To	Weekly Vehicle Hour Increase	Peak Bus Increase
Tier 1 priority					
New	76-Beaverton/Tualatin	Beaverton TC	Tualatin	390	3
New	31-King Rd	Milwaukie TC	Clackamas TC	240	2
Span	4-Division/Fessenden	Portland Mall	Gresham TC	50	0
Span	8-Jackson Park/NE 15th	Portland Mall	Marquam Hill	25	0
Span	15-Belmont/NW 23rd	Portland Mall	92nd Ave	75	0
Total				**860**	**5**
Tier 2 priority					
Extension	54-Beaverton-Hillsdale Hwy	Beaverton TC	Scholls Ferry Rd	225	2
Extension	33-McLoughlin	Oregon City TC	Clackamas Community College	260	2
New	35-Macadam/Greeley	Oregon City TC	Portland Mall	605	0
Extension	31-King Rd	Clackamas TC	152nd	125	1
Span	12-Barbur/Sandy Blvd	Portland Mall	Durham Rd	60	0
Span	12-Barbur/Sandy Blvd	Portland Mall	Parkrose TC	40	0
Span	33-McLoughlin	Portland Mall	Oregon City	160	0
Total				1,475	5
Tier 3 priority					
Extension	12-Barbur/Sandy Blvd	Durham Rd	Sherwood	140	2
New	79-Clackamas/Oregon City	Clackamas TC	Oregon City TC	305	3
New	87-Airport Way/181st	NE Sandy Blvd	SE Powell Blvd	380	2
Total				**825**	**7**

Note: Span refers to hours of service (e.g. 6 a.m. to 11 p.m.)

Bus Service Changes Related to Westside Express Service (WES)

The construction and operation of WES is the major transit development initiative in Beaverton, Tigard and Tualatin. WES will travel between Wilsonville and the Beaverton Transit Center, making stops in Downtown Tualatin, the Tigard Transit Center, and at Hall Boulevard in the Washington Square Regional Center. Existing bus lines will serve the Beaverton, Hall, and Tigard stations. Planning is underway to evaluate bus connections at the Tualatin station. The Wilsonville station will be served by South Metro Area Rapid Transit (SMART).

Beaverton Transit Center Station

The 11 existing bus lines at Beaverton Transit Center will connect with WES, as will MAX Red and Blue Lines. The Red Line is planned to extend to Merlo Road station and will be the main transfer connection for trips to/from central Portland and Portland International Airport, while the Blue Line will serve the Beaverton-Hillsboro corridor.

Hall/Nimbus Station

Bus connections with Lines 76/78 (proposed Frequent Service), bus stop and pedestrian access improvements are planned at this station. The area’s Transportation Management Association or other entities could consider shuttle connections to nearby offices and shopping. The station will also have about 160 park-and-ride spaces.

Tigard Transit Center Station

This station will provide about 120 park-and-ride spaces and connect with five TriMet bus lines. Bus service between Tigard, Beaverton, Tualatin, Sherwood, and within Tigard have been improved over the last several years. TriMet and the City of Tigard developed a local area plan to improve access, leverage public and private investments, enhance mobility options, and to review transit needs identified in Tigard’s Transportation System Plan. Eleven options for capital improvements that would benefit service (such as shelters, benches, and sidewalks) were evaluated for Tigard.

The plan identified Bonita Road as a priority for transit service. A short distance away from the Tigard Transit Center, Bonita Road is a predominantly low-income area with many apartment complexes. Pending funding availability, bus lines would be rerouted along Bangy and Bonita Roads to serve this area and to provide a connection between Tigard and the Kruse Way employment area. Transit service on SW 72nd Avenue would be provided by an extension of a nearby line (pending availability of operational funding) to connect businesses on SW 72nd Avenue with commuter rail. The Sequoia Parkway employment area would also be served better.

Tualatin Station

Riders will access commuter rail in Tualatin by walking, driving or taking the bus to the station. Access to the commuter rail station on Boones Ferry Road will be enhanced with both pedestrian improvements and 111 park-and-ride spaces. TriMet is assessing the feasibility of extending or rerouting lines to serve the station, including lines 76-Beaverton/Tualatin and 96-Tualatin/I-5.

Considerations include operations and capital costs of additional buses, impacts on existing riders and availability of bus stop facilities at the Tualatin Commuter Rail station.

Another consideration is the ability of the planned park-and-ride lot to accommodate opening day and future demand for parking at this station. TriMet will address concerns regarding potential overflow parking into the lots of adjacent businesses with a range of park-and-ride management strategies. Feeder bus connections under consideration would expand access options.

Connecting Sherwood and area employers to commuter rail via Tualatin-Sherwood Road is a long-term goal identified in the Regional Transportation Plan.

5.2 Bus Service Changes Related to I-205 Light Rail Project

Along Sunnyside Rd., TriMet extended Line 155-Sunnyside from SE 147th to SE 162nd in August 2007 serving the new Happy Valley Town Center and other new development in the area. Frequency of service was improved to 35 minutes, seven days a week. Since these improvements, ridership on Line 155 has increased by more than 50 percent.

The I-205/Green Line MAX Light Rail line will terminate at the Clackamas Town Center Transit Center. Extensive renovation of the Clackamas Town Center property includes a new bus stop area near the mall entrance opened in Fall 2008 and a new MAX station and park-and-ride structure with 750 spaces to open in September 2009.

Two bus lines will have route changes to take advantage of this investment:

- Line 10-Harold will be extended to serve the Foster Rd./Lents Town Center Station. The new routing via SE Harold, 136th, and Foster Rd. also provides a layover at the terminus on Foster Rd.
- The present Line 31-Estacada will be divided and designated as two separate lines, with Line 30-Estacada operating between Clackamas Town Center MAX Station and Estacada, and Line 31-King Rd. operating between downtown Portland, Milwaukie and the Clackamas Town Center. Express trips between Estacada and downtown Portland will be retained.

Preliminary planning for new local services has included:

- Modeling new transit lines providing improved "cross-county" connections along SE Johnson Creek Boulevard and SE Thiessen Road as part of the South Corridor Study. Further review of these proposed routes is needed.
- Continuing to work with Clackamas County to define a transit corridor from the Clackamas Regional Center to the emerging Town Center of Damascus. Discussion with the City of Damascus regarding TriMet service and thresholds for developing new services is pending.

The Milwaukie community has for many years expressed a desire to shift the location of bus stops that now comprise downtown Milwaukie's on-street transit center and reduce the bus layovers in downtown Milwaukie. The City of Milwaukie and TriMet have agreed to reduce the impact of the on-street transit operations by reducing bus layovers. With the opening of the Green Line in September 2009 and interlining of several bus routes and other adjustments, the number of weekly bus layovers in downtown Milwaukie will be reduced by 52 percent from 2004 levels. Improved bus stops in the form of Level III shelters and other amenities will be part of bus stops on SE Jackson Street between Main and 21^{st}. Reconstruction of Jackson St. and bus stop improvements are expected to be completed in 2010. Future alignments for bus service in downtown Milwaukie are now under consideration in the context of Preliminary Engineering for the Portland-Milwaukie light rail project. TriMet, City and project staff is assessing alternatives for bus routing, stops, and bus-rail connections. There will be further consultation with the City Council and community stakeholders before a final plan for bus service in downtown Milwaukie is affirmed.

5.3 Bus Service Changes Related to Portland Mall Light Rail Project

The downtown Portland Transit Mall was reopened for bus service on May 24, 2009. Bus lines that served SW 3^{rd} and 4^{th} Avenues during light rail construction now serve the Transit Mall on SW 5^{th} and 6^{th} Avenues. Bus lines that served SW Columbia and Jefferson Streets during construction remain on Columbia and Jefferson to provide a grid of light rail, streetcar, and bus to serve the entire downtown, including growing areas in the West End. Fewer buses will operate on the Mall north of Burnside, with Lines 9-Broadway/Powell and 17-Holgate/NW 21^{st} operating on Broadway north of Burnside instead of 5^{th} Ave. In addition, access to PSU is improved with buses using the Mall and Harrison St. to serve the campus. Lines that formerly used SW Clay and Market to enter and leave downtown now operate on SW Harrison.

Two lines have been reconfigured to take advantage of the new opportunities presented by frequent light rail service on the Portland Mall:

- Line 10-NE 33^{rd} Ave. has been designated as Line 73-NE 33^{rd} with improved midday frequency and a terminus at the Rose Quarter Transit Center, connecting with frequent MAX and bus service. Line 10-Harold operates across the Mall on SW Main, Broadway, and Madison before returning to Southeast Portland.
- Line 14-Hawthorne operates across the Mall on SW Main, Broadway, and Madison.

5.4 Bus Service Changes Related to Columbia River Crossing Project

At this time, there are no sustentative changes to the TriMet bus service as a result of this project.

Downtown Portland bus service

Effective May 24, 2009

Mall bus groupings

5th Avenue

- **A** 9, 17, 19
- **B** 4, 31, 32, 33, 99
- **C** 35, 36, 44, 54, 56
- **D** 1, 8, 12, 94

6th Avenue

- **W** 8, 9, 17
- **X** 35, 36, 44, 54, 56, 99
- **Y** 4, 31, 32, 33
- **Z** 1, 12, 19, 94

This page left blank intentionally.

5.5 Maintenance Facilities Expansion

TriMet's bus maintenance facilities have parking capacity for 750 vehicles (200 at Powell, 300 at Center, 250 at Merlo). Today, TriMet's bus fleet is 645 vehicles (including contingency vehicles). There is parking capacity, therefore, for 105 additional vehicles before additional parking has to be built. There are 55 bus maintenance bays between the three garages. Maximum annual bay hours total 341,880 (55 bays multiplied by 24 hours per day multiplied by 359 days per year). Present annual maintenance requirements are 236,000 work hours.

TriMet expects to add five buses into service by 2013. Beyond this period, TriMet expects to add seven - eight vehicles a year to the base fleet. At this rate of growth, additional parking capacity will be required by 2020. This can be accommodated by building a parking deck at the Center Street facility or by expanding maintenance bays at Powell and moving the LIFT program to a leased site. Powell and Center are centrally located and are both equally good locations in terms of minimizing deadhead service costs. The cost of the needed expansion is included in the financial forecast in 2020. Paratransit

Table 5-2 shows the capacity at each bus garage facility and compares it to the current use.

Paratransit

Table 5-2. Garage Capacity

	Capacity	# Buses Assigned	Additional Capacity
Center	285	283	2
Merlo	250	131	119
Powell	225	205	20

The Nela location has parking for 90 LIFT buses. The Powell LIFT operating facility in SE Portland has parking for 100 buses. The Merlo LIFT operating facility in Beaverton currently has parking for 80 buses. Vehicles operating from the two outlying LIFT sites are brought to the Nela location for maintenance.

Table 5-3 shows the capacity at each LIFT facility and compares it to the current use:

Table 5-3. LIFT Maintenance Capacity

	Capacity	Actual	Additional Capacity
Nela	90	82	8
Powell	100	99	1
Merlo	80	73	7
	270	**254**	**16**

It would appear from Table 5-3 that TriMet will need to expand capacity at its garages within the next few years, as the LIFT fleet has grown and is likely to continue to grow as the demand for paratransit increases.

However, TriMet is looking at several strategies to reduce the cost of ATP facility expansion in the future. The strategies are:

- Purchase smaller vehicles than the 24' LIFT buses.
- In addition, TriMet is not planning to construct additional LIFT facilities, but will look to lease parking for additional LIFT vehicles. Costs for lease parking is included in the financial forecast beginning in FY12.

5.6 Planned Bus Procurements

Vehicle Replacement – Fixed Route

TriMet replaces 40-foot fixed route buses after approximately 15 years, as the most cost-effective life cycle. The FTA minimum replacement standard for fixed route buses is 12 years. But by eight to nine years of age, TriMet’s buses have accumulated 350,000 miles and are in need of engine overhauls. Having invested in overhauls, TriMet keeps its buses the additional years to get the full value from the overhaul expense.

In the 80s and 90s, TriMet purchased buses unevenly (108 one year, ten the next, etc.) and found that this caused peaks in maintenance costs. To remedy this, the buses purchased in the 80s and 90s are being replaced in even increments each year, requiring that some buses be kept for 20 – 21 years; however, the average retirement age during this decade will be kept at 15 years.

Because of the recent recession, we had to suspend bus purchases for FY10. For FY11 replacement we shall resume purchasing approximately 41 buses per year, , meeting the majority of the age standards noted above and better supporting TriMet’s financial plan. Appendix C illustrates the fixed route vehicle replacement program included in TriMet’s Capital Improvement Plan. Bus replacement is a top priority of the district. Costs of the replacement purchases, as planned, are included in the financial forecast.

Vehicle Expansion – Fixed Route

The purchase of five additional buses (not replacements) are planned between now and 2012 to support planned bus service increases. These purchases will be combined with the replacement order. Costs are included in TriMet’s New Starts Financial Forecast, which was completed spring 2008.

Vehicle Replacement - LIFT

LIFT small buses are replaced every ten years. The replacement of LIFT vehicles is a top priority of the district. LIFT vehicles have been replaced on schedule. Appendix A includes the Accessible Transportation Program LIFT vehicle replacement table from the Capital Improvement Plan. Costs of this replacement schedule are included in TriMet’s New Starts Financial Forecast.

Vehicle Expansion – LIFT

Recent LIFT service increases have required a minimum of eight vehicles per year. TriMet is forecasting continued increases in LIFT ridership, which will require adding 3 to 8 vehicles to the fleet each year (including spares) between 2009 and 2030.

5.7 Financial Forecasting

TriMet's financial forecast focuses on whether TriMet has adequate resources to operate and maintain the transit system including current service levels, capital replacement requirements and improvement capital projects, plus increases in bus and MAX service in addition to new rail projects. Financial forecasts are conducted for planning horizons that extend anywhere from five to 25 years, depending on the need.

TriMet's financial forecast was updated in Fall 2008 and is available in Appendix D. The forecast will include all of the costs presented in the TriMet Fixed Route and LIFT Fleet Management Plan.

The forecast will show full agency-wide capital and operating costs. As in the past, the forecast will show that LIFT and fixed route bus replacement and additions to the fleet are affordable.

This page left blank intentionally.

APPENDICES

This page left blank intentionally.

Appendix A. LIFT Vehicle Fleet Details

TABLE 3A. ATP/LIFT VEHICLE REPLACEMENT & EXPANSION

LIFT BUSES - ACTIVE FLEET

FLEET NBR	FY BUILT	BUS LENGTH	FLEET SIZE	BUS MAKE & DESCRIPTION	AGE END FY 2009	REPLACE END FY	CURRENT	ACTIVE ATP FLEET SIZE END FISCAL YEAR 2008	2009	2010	2011	2012	2013	2014
25	2000	24	27	Eldorado	9	2010	27	27	27	0	0	0	0	0
26	2001	24	33	Eldorado	8	2011	33	33	33	33	0	0	0	0
27	2002	24	47	Eldorado	7	2012	47	47	47	47	40	0	0	0
28	2003	24	8	Eldorado	6	2013	8	8	8	8	8	8	0	0
29	2005	12	15	4 Door Sedan	4	2010	15	15	15	0	0	0	0	0
-	2006	-	-	-	-	-		0						
30	2007	24	39	Cut Away	2	2017	39	39	39	39	39	39	39	39
31	2008	24	50	Cut Away	1	2018	50	44	50	50	50	50	50	50
32	2009	24	50	Cut Away	0	2019		0	50	50	50	50	50	50
33	2010	24	31	Cut Away	0	2020		0		31	31	31	31	31
34	2010		15	Vans	0	2020				15	15	15	15	15
35	2011	24	41	Cut Away	0	2021		0			41	41	41	41
36	2012	24	41	Cut Away	0	2022		0				41	41	41
37	2013		8	Cut Away	0	2023							8	8
38	2013		12	Vans	0	2023							12	12
39	2014		12	Vans	0	2024								12
				Fleet Size			**258**	**213**	**269**	**273**	**274**	**275**	**287**	**299**

This page left blank intentionally.

Weighted Fleet Age	5.91	3.99	3.65	3.14	2.62	2.99	3.58
WD Ridership % Increase	5.0%	4.0%	1.5%	0.5%	0.5%	0.5%	0.5%
Peak Pullouts	221	231	235	236	237	238	239
Spare Ratio**	-3.62%	16.45%	16.17%	16.10%	16.03%	20.59%	25.10%
Total Fleet Requirement	**213**	**269**	**273**	**274**	**275**	**287**	**299**

Replacement Bus	31	39	27	40	40	8	0
Replace Sedans with Vans*	5		15	0	0	0	0
Expansion Bus	13	11	4	1	1	0	0
Expansion Van			0	0	0	12	12
Total Bus Purchase	**49**	**50**	**46**	**41**	**41**	**20**	**12**

Note:

** Does not reflect separate spares for bus and van fleets.

This page left blank intentionally.

Appendix B. Detailed Fleet Management Sheets

TABLE 1A. FIXED ROUTE BUSES - ACTIVE FLEET

BUS FLEET	FY ACQ	BUS LNGTH	FLEET SIZE	BUS MAKE & DESCRIPTION	AGE FY10	REPLACE END FY	BUSES 9/13/2009	ACTIVE FLEET SIZE AT FISCAL YEAR END 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Est. Mileage at Retirement	Maximum Age at Retirement
37	1991	40	63	Gillig 1400s	19	2014	41	41	41	41	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	730,250.00	23
38	1991	30	30	Gillig 1600s	19	2015	19	19	30	30	30	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	782,784.00	24
39	1991	30	13	Gillig 1600s	19	2015	12	12	13	13	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	827,277.00	24
40	1992	40	108	FlxMetro 1700's	18	2012	82	82	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	718,841.00	20
41	1993	30	10	FlxMetro 1900's	17	2013	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	764,352.00	20
44	1995	40	27	FlxMetro 1800's	15	2013	26	26	26	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	737,673.00	18
46	1998	40	22	New Flyer (Low Floor)	12	2018	22	22	22	22	22	22	22	22	4	0	0	0	0	0	0	0	0	0	0	0	969,800.00	20
47	1998	40	60	Gillig 2100s	12	2017	60	60	60	60	60	60	60	22	0	0	0	0	0	0	0	0	0	0	0	0	790,752.00	19
48	1998	40	5	Gillig 2100s	12	2016	5	5	5	5	5	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	728,761.00	18
49	1999	40	58	New Flyer (Low Floor)	11	2019	58	58	58	58	58	58	58	58	58	22	0	0	0	0	0	0	0	0	0	0	821,784.00	20
51	1999	40	60	New Flyer (Low Floor)	11	2021	60	60	60	60	60	60	60	60	60	60	42	2	0	0	0	0	0	0	0	0	927,560.00	22
52	2001	40	60	New Flyer (Low Floor)	9	2022	60	60	60	60	60	60	60	60	60	60	60	60	22	0	0	0	0	0	0	0	937,012.00	21
53	2002	40	2	New Flyer (Diesel-Electric	8	2022	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	499,824.00	20
54	2003	40	55	New Flyer (Low Floor)	7	2023	55	55	55	55	55	55	55	55	55	55	55	55	55	40	0	0	0	0	0	0	996,105.00	20
55	2004	40	25	New Flyer (Low Floor)	6	2024	25	25	25	25	25	25	25	25	25	25	25	25	25	24	24	0	0	0	0	0	1,081,855.00	20
56	2006	40	39	New Flyer (Low Floor)	4	2025	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	23	0	0	0	0	807,869.00	19
57	2009	40	40	New Flyer (Low Floor)	1	2026	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	23	0	0	0	675,000.00	17
58	2011	40	40	Low Floor	0	2027	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	23	0	0	675,000.00	16
59	2012	40	40	Low Floor	0	2028	0	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	23	0	675,000.00	16
60	2013	40	40	Low Floor	0	2029	0	0	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	23	675,000.00	16
61	2014	40	40	Low Floor	0	2030	0	0	0	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	675,000.00	16
62	2015	40	40	Low Floor	0	2031	0	0	0	0	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40	40	675,000.00	16
63	2016	40	40	Low Floor	0	2032	0	0	0	0	0	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40	675,000.00	16
64	2017	40	40	Low Floor	0	2033	0	0	0	0	0	0	0	0	40	40	40	40	40	40	40	40	40	40	40	40	675,000.00	16
65	2018	40	40	Low Floor	0	2034	0	0	0	0	0	0	0	0	0	40	40	40	40	40	40	40	40	40	40	40	675,000.00	16
66	2019	40	40	Low Floor	0	2035	0	0	0	0	0	0	0	0	0	0	40	40	40	40	40	40	40	40	40	40	675,000.00	16
67	2020	40	40	Low Floor	0	2036	0	0	0	0	0	0	0	0	0	0	0	40	40	40	40	40	40	40	40	40	675,000.00	16
68	2021	40	40	Low Floor	0	2037	0	0	0	0	0	0	0	0	0	0	0	0	40	40	40	40	40	40	40	40	675,000.00	16
69	2022	40	40	Low Floor	0	2038	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40	40	40	40	40	40	675,000.00	16
70	2023	40	40	Low Floor	0	2039	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40	40	40	40	40	675,000.00	16
71	2024	40	40	Low Floor	0	2040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40	40	40	40	675,000.00	16
72	2025	40	40	Low Floor	0	2041	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40	40	40	675,000.00	16
73	2026	40	40	Low Floor	0	2042	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40	40	675,000.00	16
74	2027	40	40	Low Floor	0	2043	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40	675,000.00	16
75	2028	40	40	Low Floor	0	2044	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	675,000.00	16
Total Fleet Size (Without Expansion or Special Services" B							**616**	**616**	**623**	**623**	**623**	**623**	**623**	**623**	**623**	**623**	**623**	**623**	**623**	**623**	**623**	**623**	**623**	**623**	**623**	**623**		

				2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Weighted Average Replacement Fleet Age At Year End				11.42	11.29	11.02	10.79	10.31	9.80	9.65	9.43	9.20	8.92	8.57	8.28	7.99	7.70	7.47	7.33	7.30	7.30	7.30
Weighted Average Active (Replacement + Expansion) Fleet Age At Year End				11.42	11.29	10.97	10.70	10.18	9.65	9.45	9.21	8.94	8.64	8.26	7.96	7.64	7.35	7.09	6.94	6.58	6.86	6.53
Low Floor Fleet (w/o Expansion Buses) =>			361	361	401	441	481	521	561	601	623	623	623	623	623	623	623	623	623	623	623	623
Standard (High Floor) Fleet (w/o Expansion Buses) =>			255	255	222	182	142	102	62	22	0	0	0	0	0	0	0	0	0	0	0	0
Replacement Buses				0	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Expansion Buses				0	0	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3
Total Buses Purchased				**0**	**40**	**43**	**42**	**43**	**42**	**43**	**42**	**43**	**42**	**43**	**42**	**43**	**42**	**43**	**42**	**43**	**42**	**43**
Average # of Buses Purchased Annually:	40																					
Average # of Replacement Buses Annually:	38																					
Total Fleet Size Including Expansion Buses				**616**	**623**	**626**	**628**	**631**	**633**	**636**	**638**	**641**	**643**	**646**	**648**	**651**	**653**	**656**	**658**	**661**	**663**	**666**

FLEET REQUIRED			Current 12/8/2008	ACTIVE FLEET SIZE AT FISCAL YEAR END 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Estimated Peak Pullouts			525	**525**	**525**	**527**	**530**	**532**	**534**	**536**	**538**	**540**	**542**	**544**	**546**	**548**	**550**	**552**	**554**	**556**	**558**	**560**
Spares			83	81	81	82	82	82	82	83	83	83	84	84	84	85	85	85	85	86	86	86
Total Fleet Required (Excluding Special Services" Buses)			**608**	**606**	**606**	**609**	**612**	**614**	**616**	**619**	**621**	**623**	**626**	**628**	**630**	**633**	**635**	**637**	**639**	**642**	**644**	**646**
Spare Ratio (based on actual fleet):			17.33%	17.33%	18.67%	18.79%	18.49%	18.61%	18.54%	18.66%	18.59%	18.70%	18.63%	18.75%	18.68%	18.80%	18.73%	18.84%	18.77%	18.88%	18.82%	18.93%
Spare Ratio (based on required fleet):			15.81%	15.43%	15.43%	15.56%	15.47%	15.41%	15.36%	15.49%	15.43%	15.37%	15.50%	15.44%	15.38%	15.51%	15.45%	15.40%	15.34%	15.47%	15.41%	15.36%

This page left blank intentionally.

Appendix C. Fixed Route Vehicle Fleet Details

TABLE 1B. VEHICLES SYSTEMS - FIXED ROUTE BUSES

CAPITAL REQUIREMENTS

ITEM REQUIRED	# OF VEHICLES	YEAR NEEDED	OPTIMUM REPLACEMENT CYCLE	2010	2011	2012	2013	2014	FY10-FY14 TOTAL
Replacement Buses									
Low Floor 40-foot Buses	0	2010	17 Yrs/675,000	$0					$0
Low Floor 40-foot Buses	40	2011	17 Yrs/675,000		$16,000,000				$16,000,000
Low Floor 40-foot Buses	40	2012	17 Yrs/675,000			$16,000,000			$16,000,000
Low Floor 40-foot Buses	40	2013	17 Yrs/675,000				$16,000,000		$16,000,000
Low Floor 40-foot Buses	40	2014	17 Yrs/675,000					$16,000,000	$16,000,000
Total Replacement				**$0**	**$16,000,000**	**$16,000,000**	**$16,000,000**	**$16,000,000**	**$64,000,000**
Expansion Buses									
Low Floor 40-foot Buses	0	2010	17 Yrs/675,000						$0
Low Floor 40-foot Buses	0	2011	17 Yrs/675,000		$0				$0
Low Floor 40-foot Buses	3	2012	17 Yrs/675,000			$1,230,000			$1,230,000
Low Floor 40-foot Buses	2	2013	17 Yrs/675,000				$820,000		$820,000
Low Floor 40-foot Buses	3	2014	17 Yrs/675,000					$1,230,000	$1,230,000
Total Expansion				**$0**	**$0**	**$1,230,000**	**$820,000**	**$1,230,000**	**$3,280,000**
Total				**$0**	**$16,000,000**	**$17,230,000**	**$16,820,000**	**$17,230,000**	**$67,280,000**

Low Floor Replacement Bus*	$400,000	(Based on FY10 dollars)
Low Floor Expansion Bus*	$410,000	
Diesel-Electric Hybrid	$525,000	

* Includes particulate trap and auto stop announcement

This page left blank intentionally.

Appendix D. TriMet Fall 2008 Financial Forecast

This page left blank intentionally.

Fall 2008 Financial Forecast

FY10 Budget Forecast and Financial Analysis

Tri-County Metropolitan Transportation District of Oregon

Financial Analysis & Grants Administration Department, Fall 2008

Fall 2008 Financial Forecast

Table of Contents

Page #

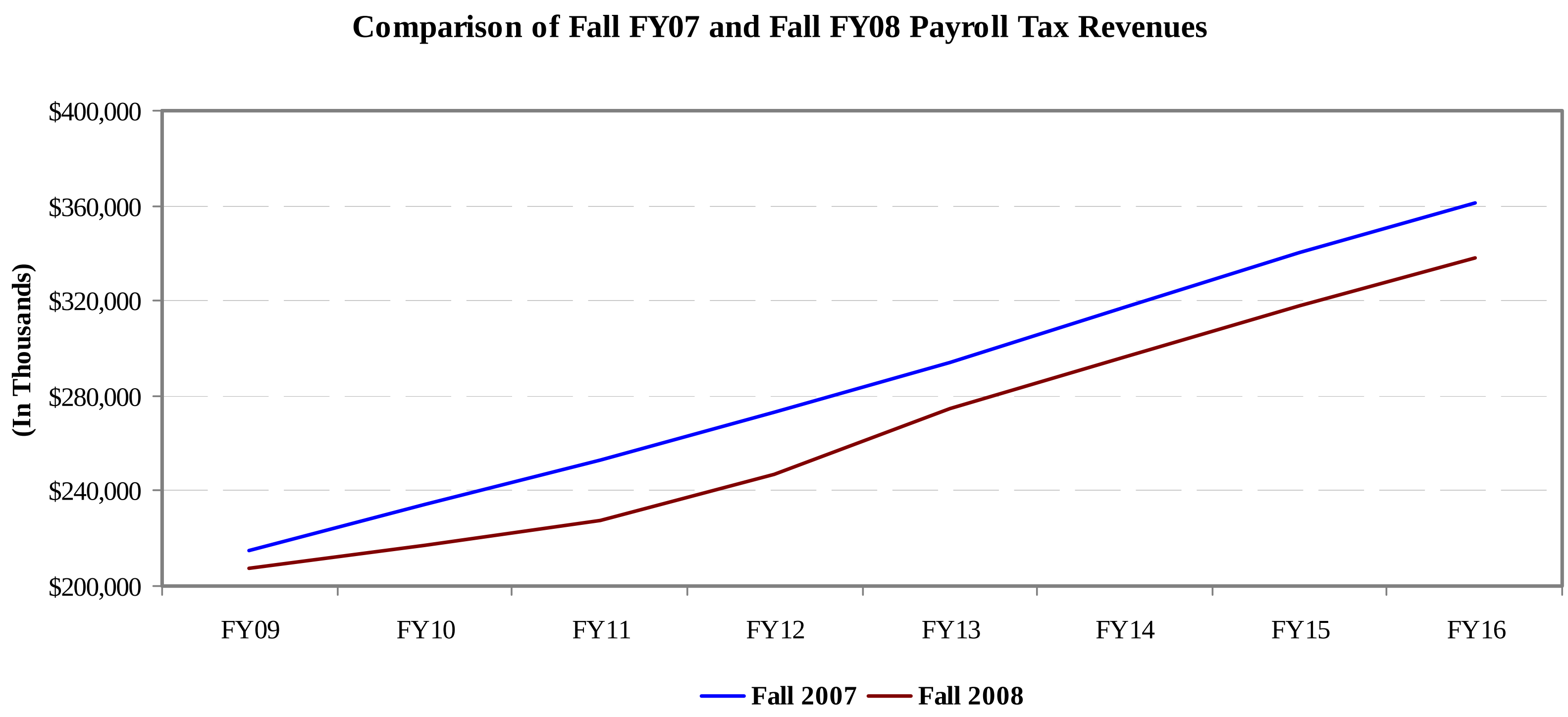
Fall 2008 Financial Forecast

Budget Forecast and Financial Analysis Summary

Revenue Assumptions

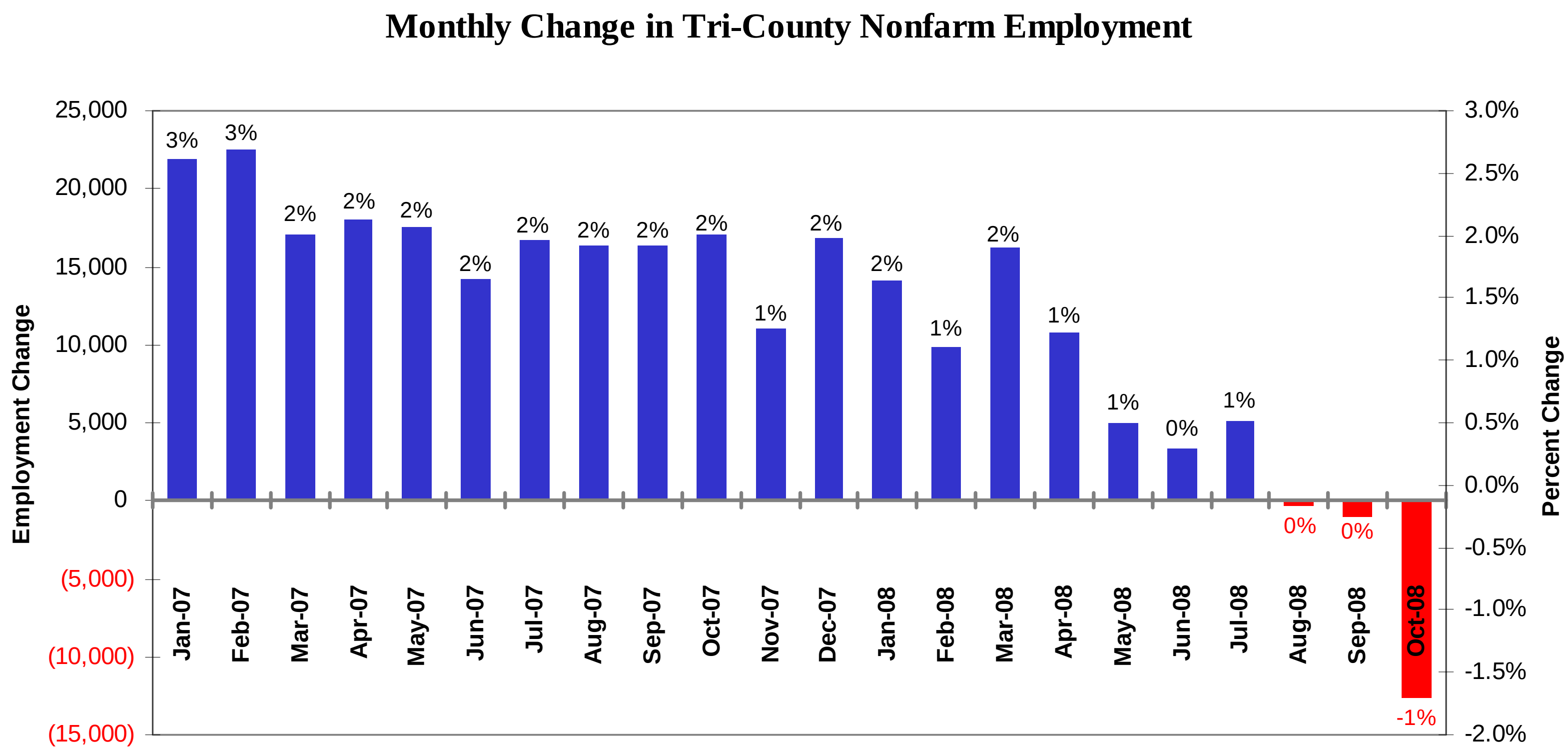
Economic slowdown projected FY09-FY11.

ECO Northwest projects one quarter of job losses, and below average job growth for five quarters. Underlying growth payroll tax forecast: +2.0% FY09, 2.8% FY10, 3.2% FY11. Payroll tax surges in FY12 and FY13, growing 7% and 9.5% respectively. Recessions associated with credit crunches or housing busts tend to be deeper and longer than others. FY10 payroll tax forecast $17.9 million lower.

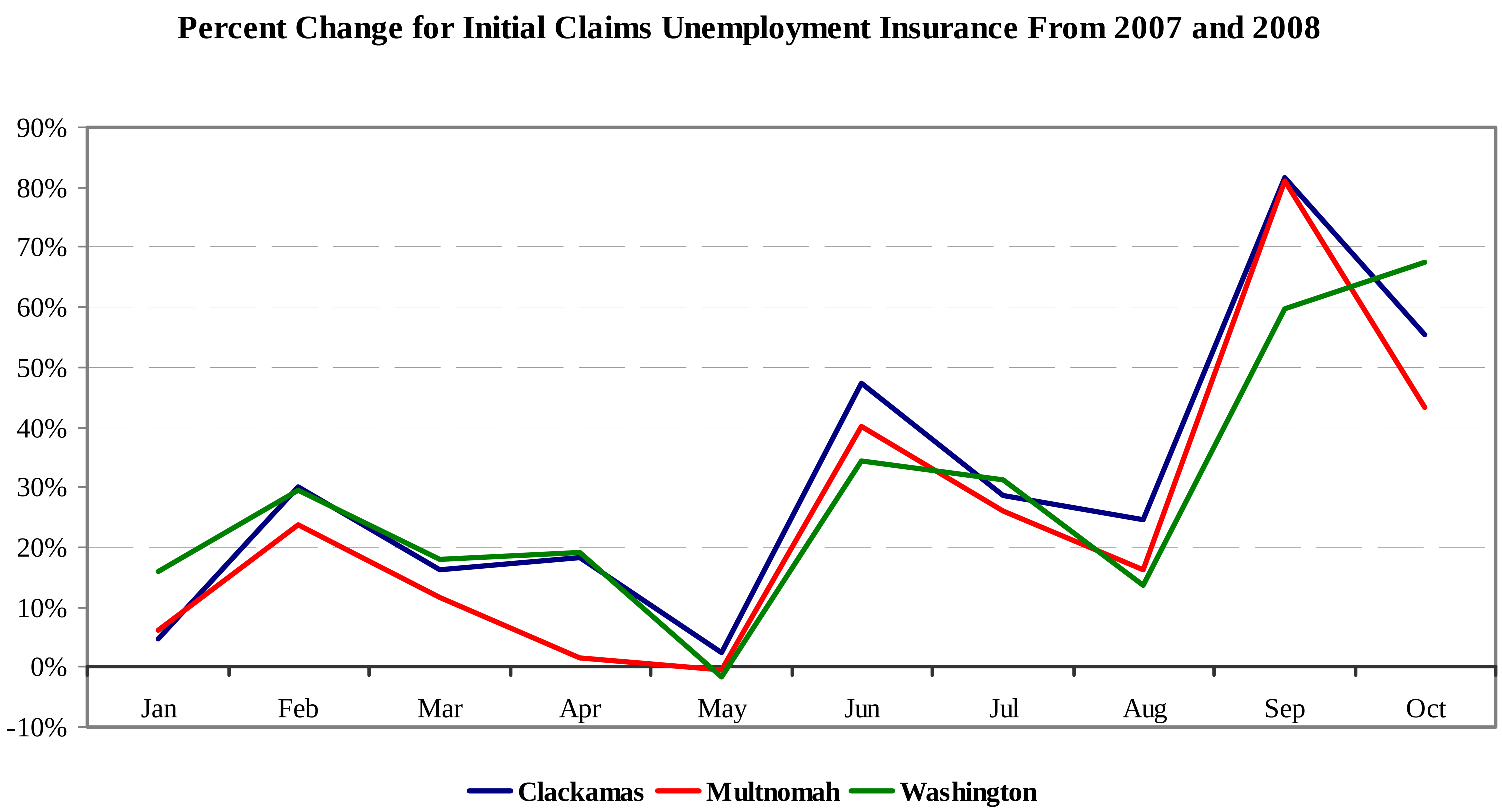


Local employment is down and unemployment is up

Calendar 2007-16,000 jobs added each month in tri-county area. September 2008 begins the decline – with loss of 1,040 jobs. October 2008 –12,690 jobs (1.5%). Local unemployment is up 1 percentage point in each county with the highest unemployment in Multnomah county at 6.1%.

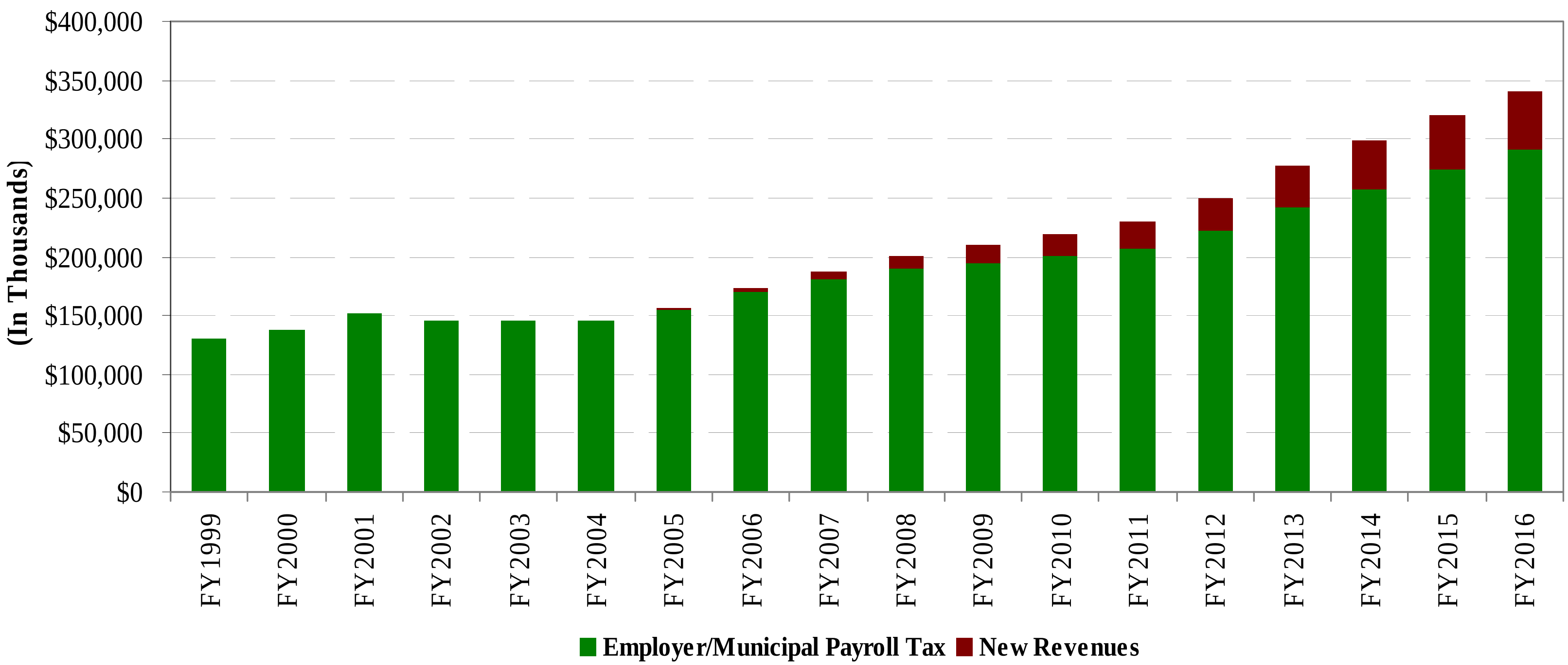


Initial claims for unemployment are up significantly



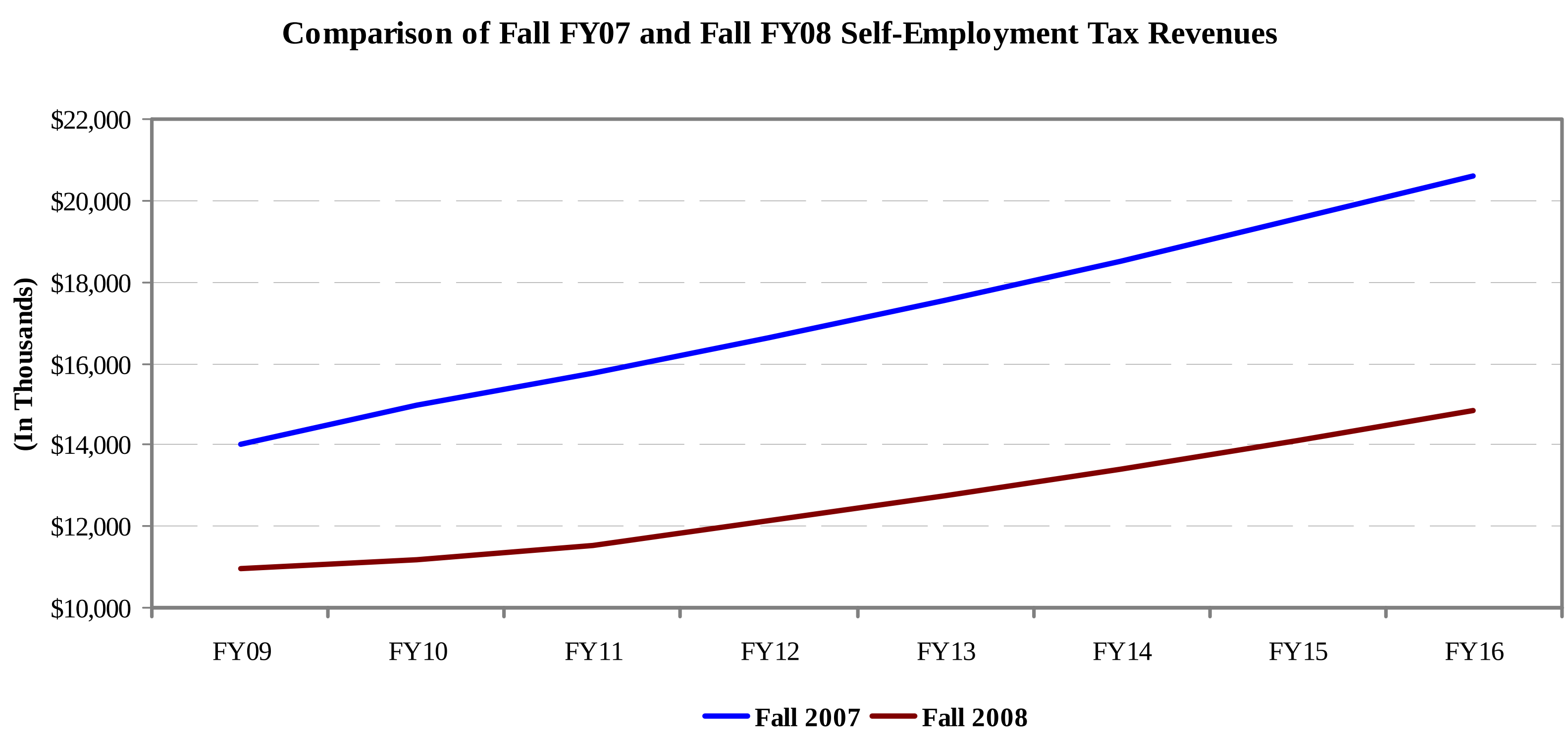
Employer payroll tax grows, albeit at a slower rate

Historical note: Great Depression comparison: Bank failures nationwide to date = 20. Bank failures first half of 1933 = 4,000. Unemployment nationwide November < 7.0%. Unemployment 1933 = 25%.

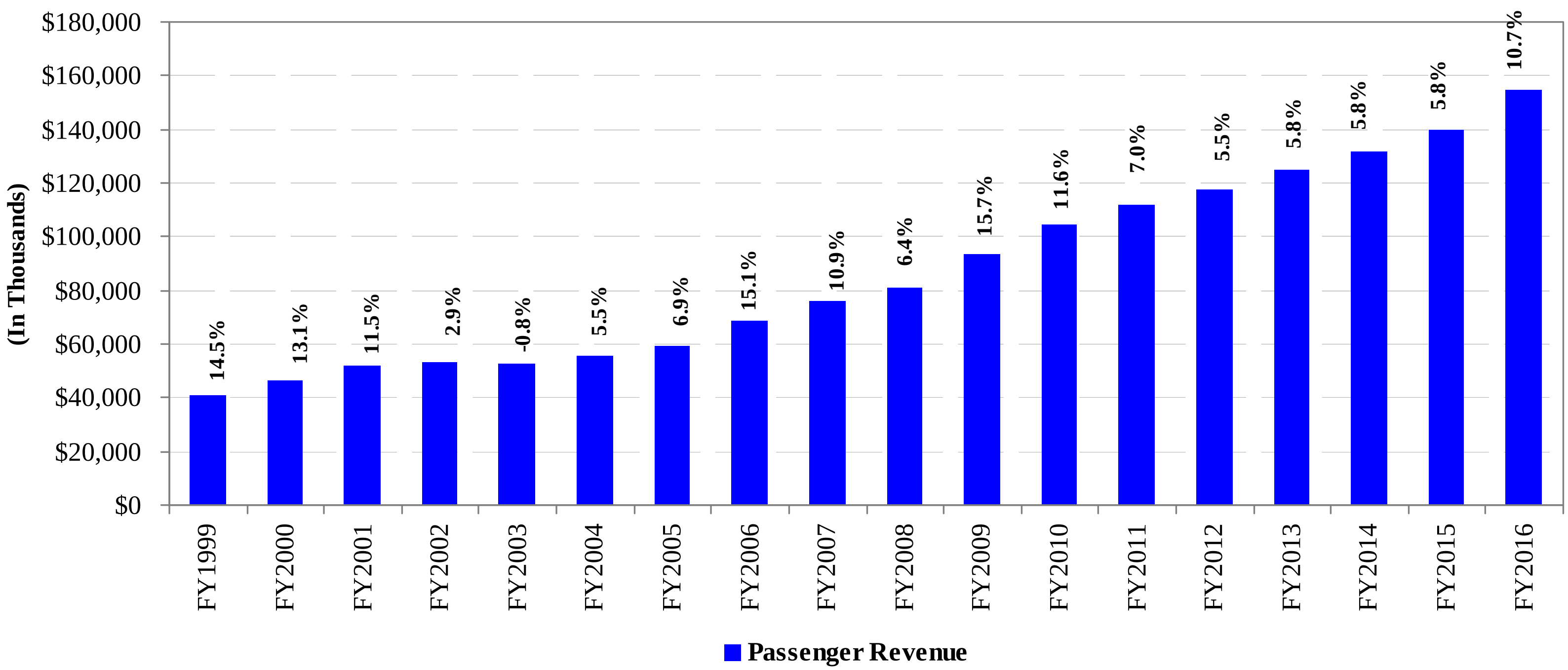


Self-employment revenue and growth moderates.

FY06+19.8%, FY07+21.3%, FY08-2.7%, FY09-2.0%, FY10+1.7%, FY11+3.3%. Forecast near term growth rates are lower than last year. Expectations are for $4.5 million lower self-employment revenues annually compared to previous forecast.

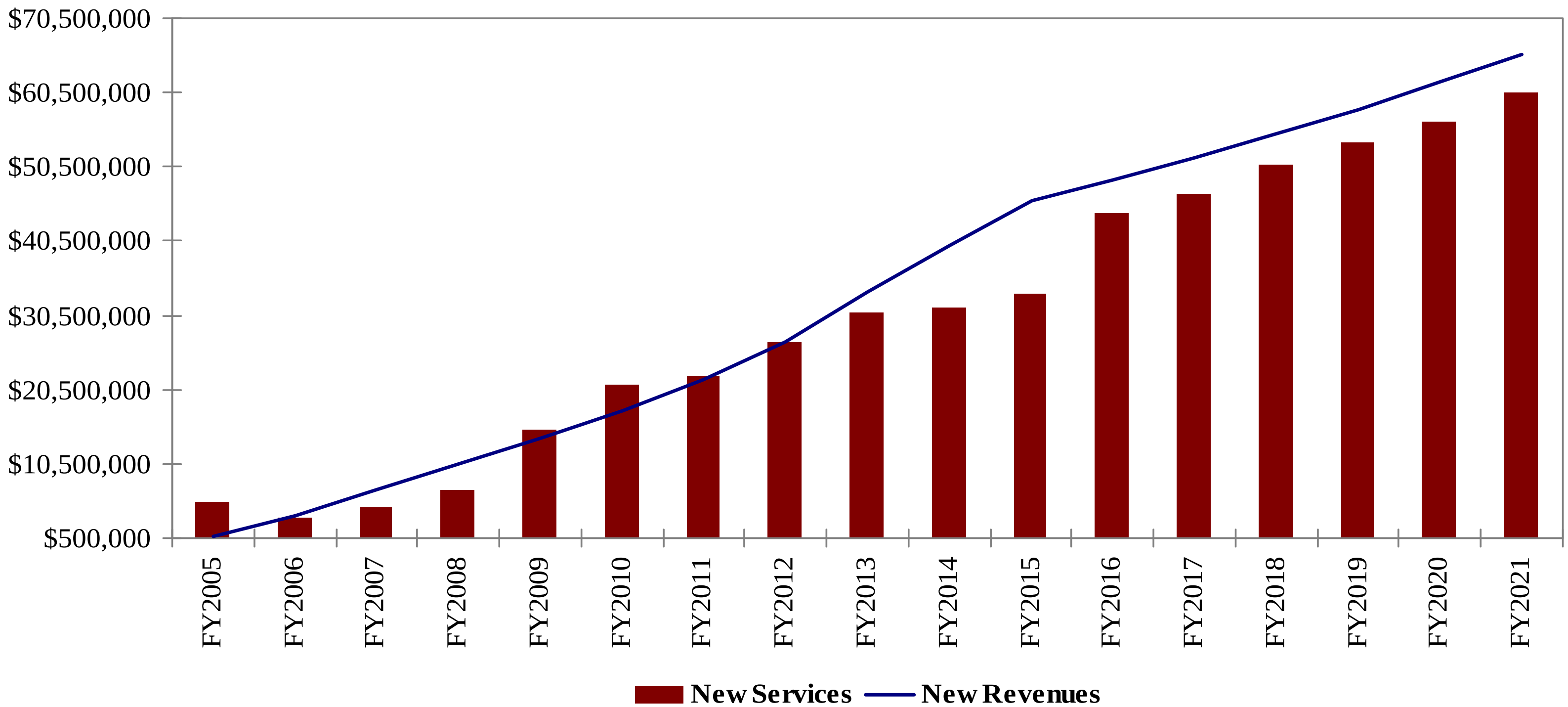


Strong passenger revenue growth projected. Strong demand for services projected throughout the forecast. Passenger revenue projected to be 4% over budget FY09. Passenger revenue grows 15% in FY09, 12% in FY10, 7% in FY11. Annual inflation adjusted fare increases assumed. If energy prices continue to decline, a September 2009 fare increase could be counter productive. Passenger revenue increased faster than payroll tax revenue last ten years and that trend is projected to continue.



New services are funded with payroll tax increase.

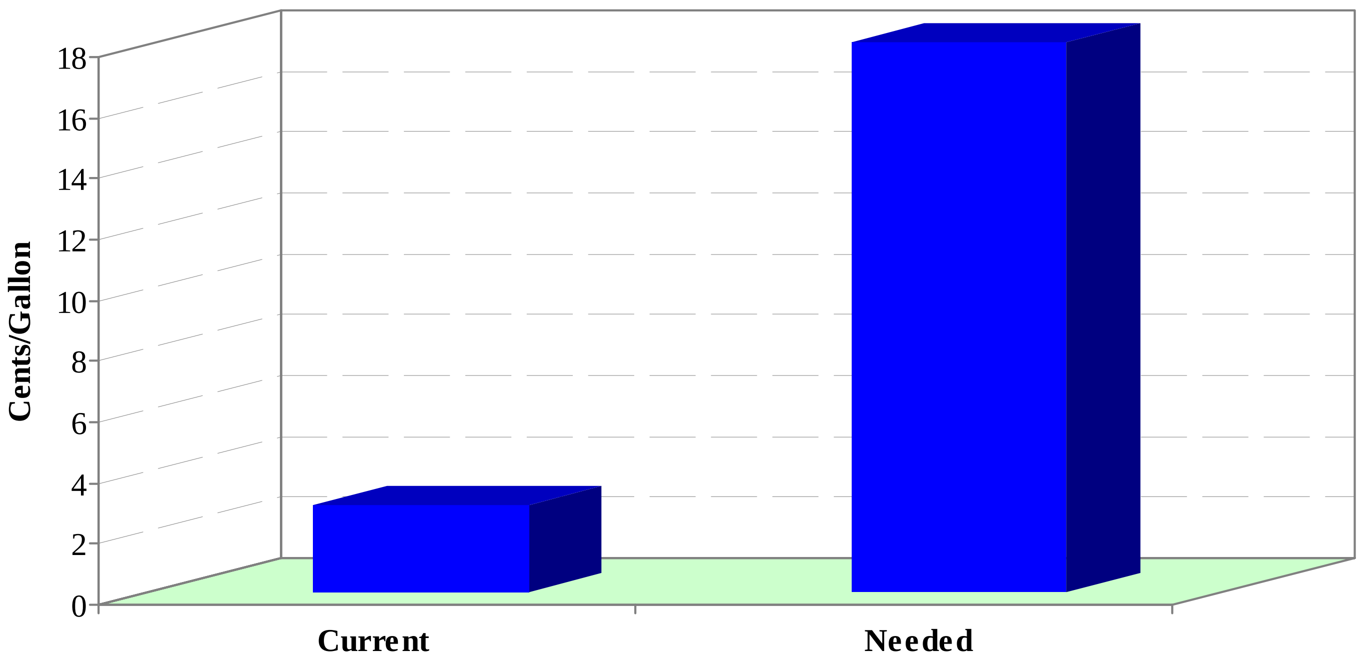
Costs of Commuter Rail, I205/Portland Mall LRT, Streetcar, LIFT and other services are paid with new revenues. New revenue forecast includes TriMet's share of Milwaukie light rail capital costs, cost of Milwaukie operations. The rail projects contribution to TriMet's on-going revenue and expenditure imbalance is marginal, with the exception of the impact of Commuter Rail cost increases on TriMet's FY09-FY12 cash reserves and debt service. Approximately two–thirds of Commuter Rail overruns are paid back to TriMet by Metro and Washington County by FY12, however.



Federal Transportation Program Authorization ends 9/30/09.

15% of TriMet operating revenues ($55M) are federal funds. New transportation bill expected to take 2 years to complete. In the meantime transportation funding is sustained with Continuing Resolutions. 12 to 19 cent per gallon increase in gas tax (or equivalent) needed to fund program at today's levels plus inflation. Federal gas tax today is 18.6 cents per gallon. Forecast is for a status quo +3% annual increase in TriMet federal operating funds.

Federal Fuel Tax for Transit



Additional revenue assumptions:

- No additional revenues assumed for Elderly and Disabled Transportation Program. The 2.5 cent cigarette tax increase proposed in the governor's budget could provide an additional $.5-1 million a biennium over forecast for LIFT vehicle replacement.

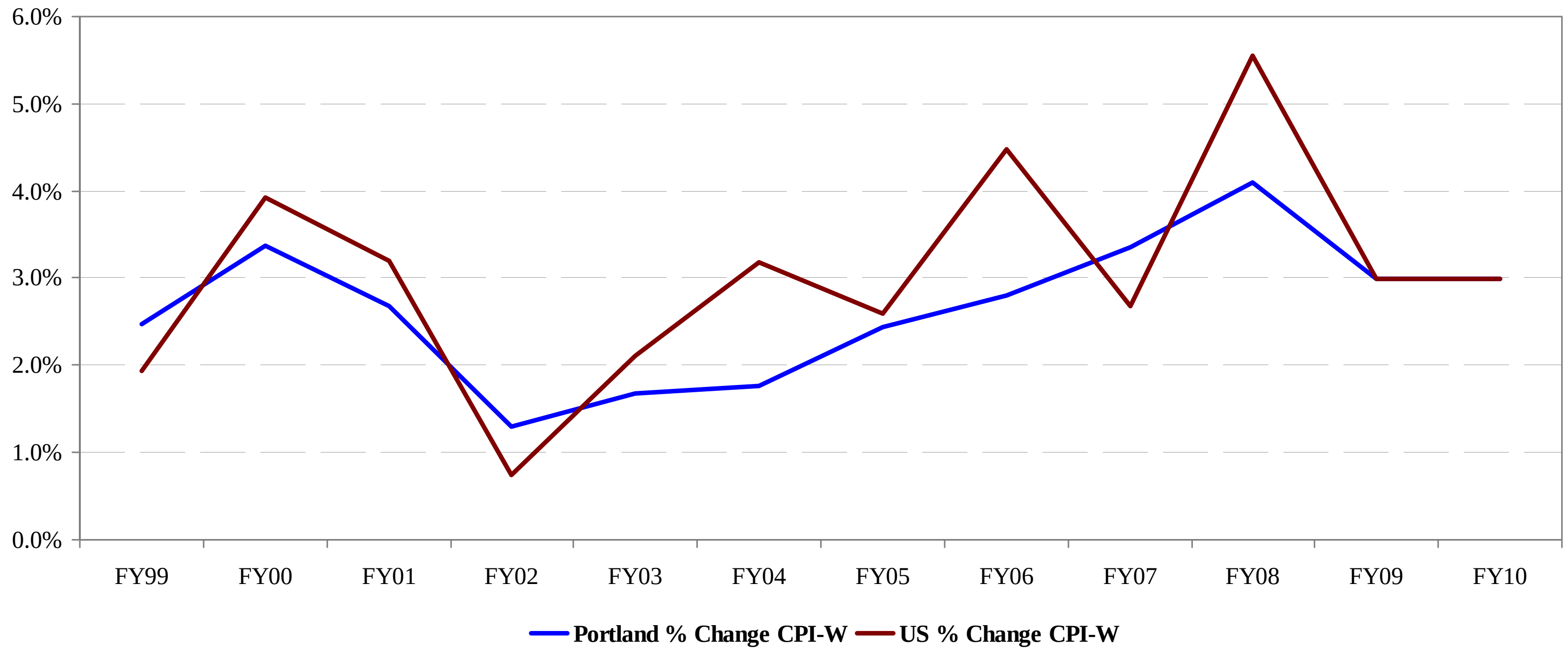
- No stimulus revenues assumed.

- No increase in payroll tax rate is assumed.

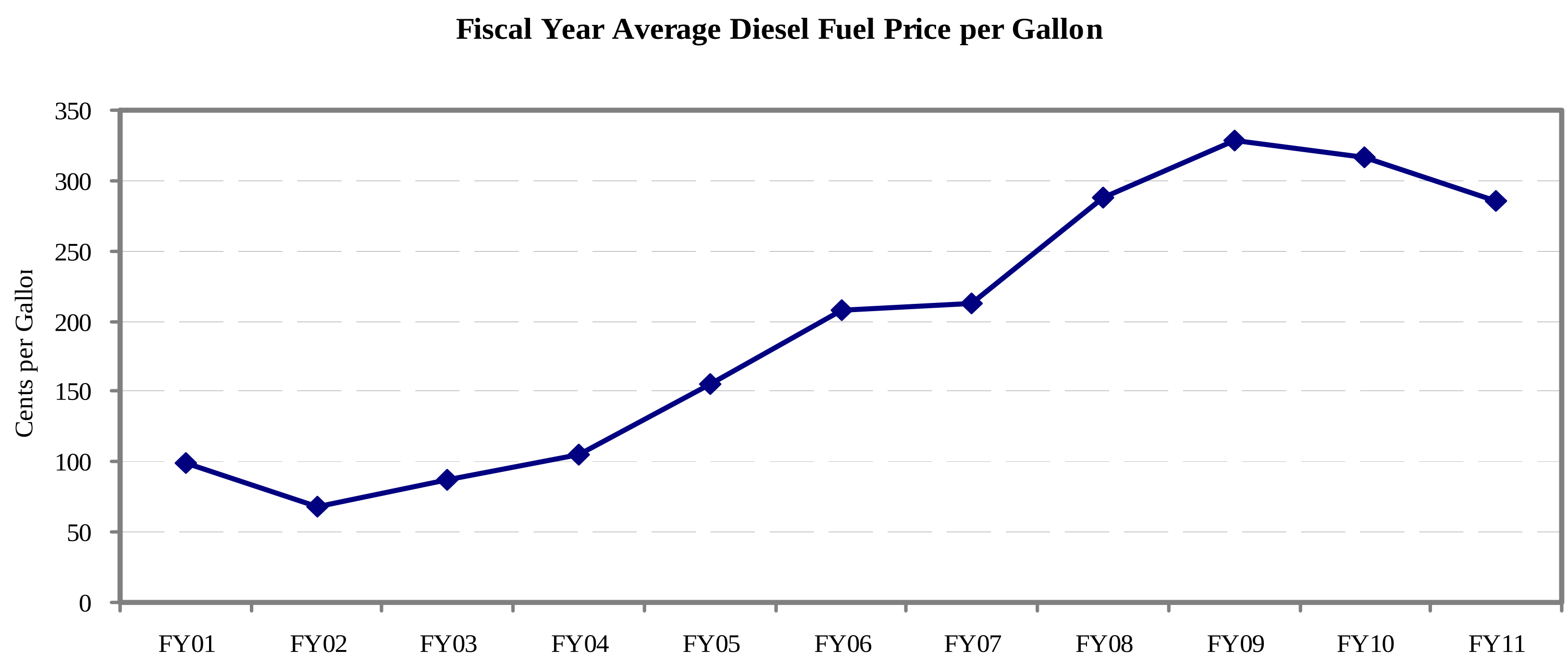
Expenditure Assumptions

Global economic slowdown cools inflation.

Local inflation is projected to slow to 3% annual growth in the June 2009 CPI release. Union wage and construction cost growth will moderate. The December 2009 union wage increase is projected to be 1.5%, the first time in 2 years union wages increase at the floor. Actual and projected union wages are 3.4% in FY08, 4% in FY09, 3.6% in FY10 and 3% thereafter. Each 1% = $1.3 million.

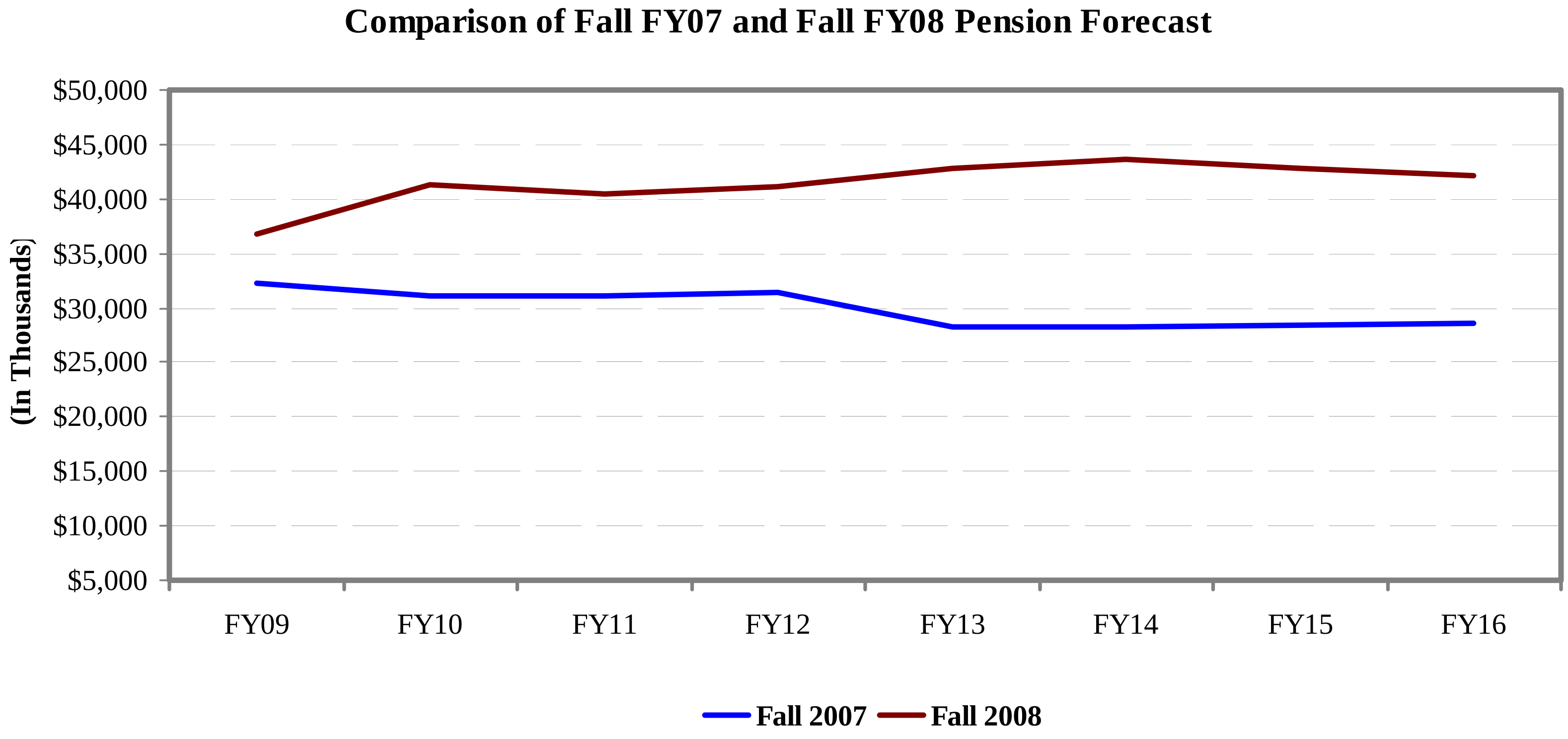


Global economic slowdown reducing fuel costs. Diesel fuel cost per gallon in FY09 - $3.37 including fixed, floating, biodiesel, bus, LIFT and Commuter Rail. Saves $5 million from budget in FY09 and $6.4 million in FY10 from previous forecasts. Floating cost average in FY09 = $2.48 per gallon, and $2.86 in FY10. Fuel increases 6% per year FY11 and beyond.



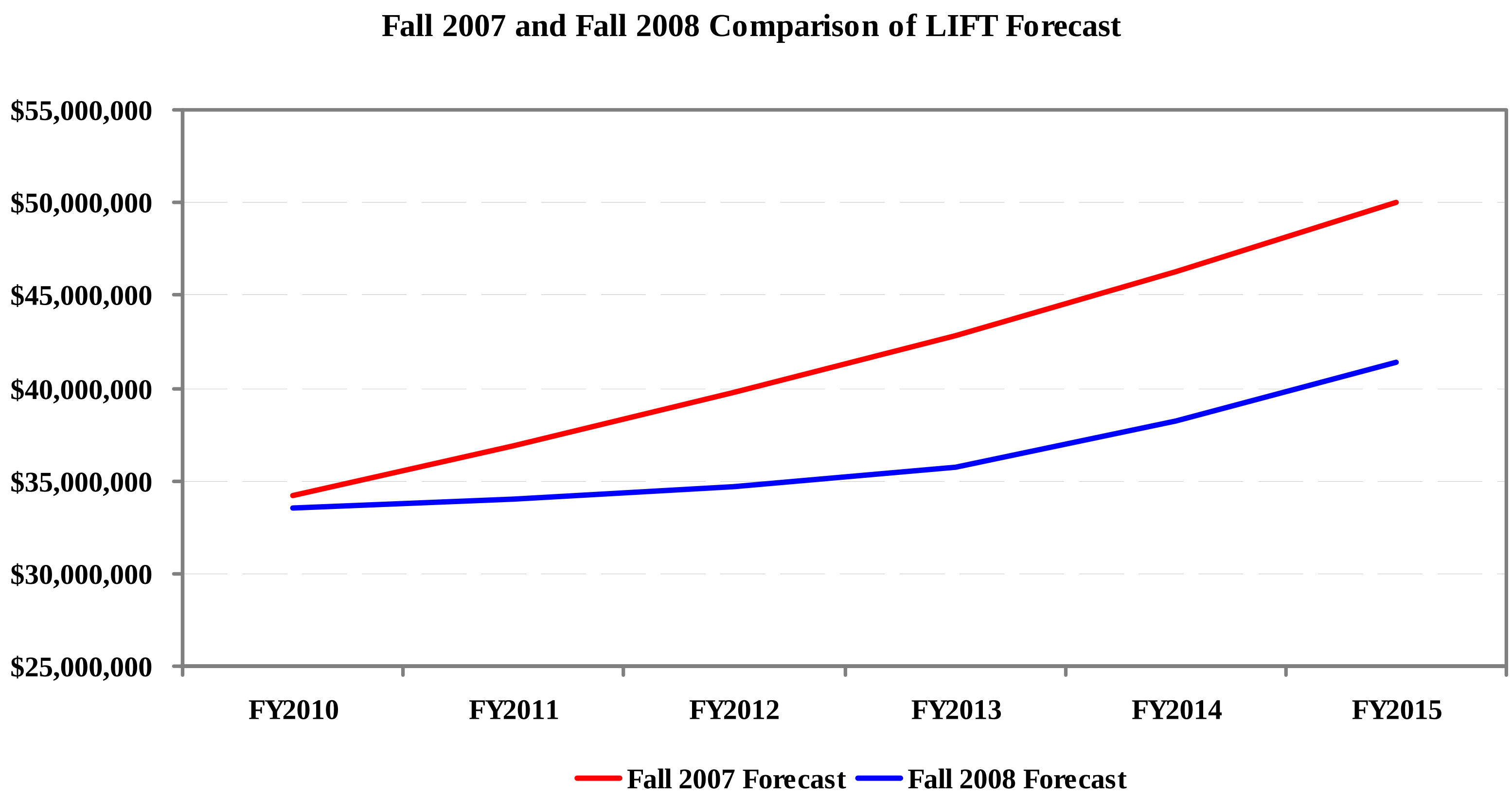
Stock market losses will increase cost of pension funding

If market valuation is down 20% June 30, 2009, then increases 7%(mgmt) to 8%(union) annually thereafter, DB pension costs will be $7.0 million higher than previous forecast and increasing over time. Actuarial changes increased FY09 costs an additional $2.5 million over forecast. Historical note: Since 1900, stock market appreciation plus dividends has averaged 7.3% per year. S&P close June 30, 2008=1,280. December 11 S&P=901 (–30%).

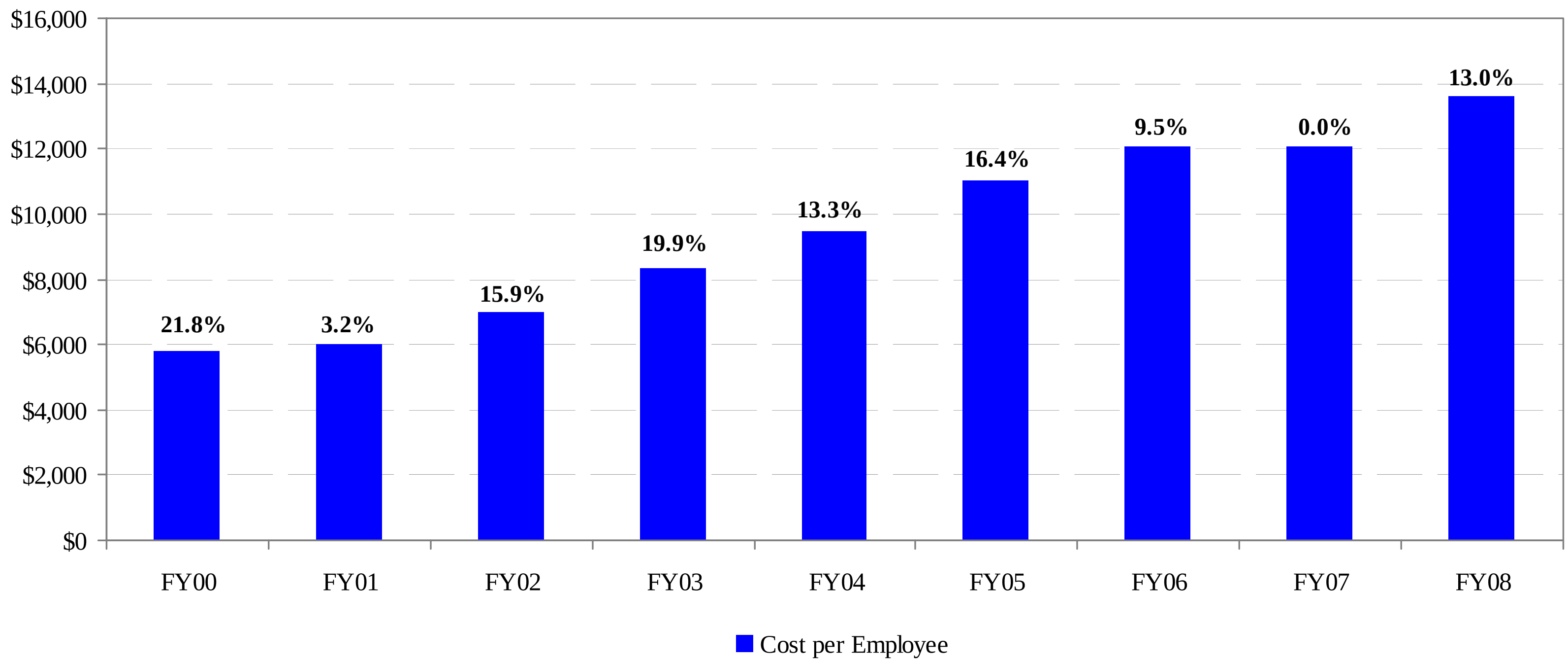


TriMet begins LIFT in-person assessments with conditional eligibility determination, FY10.

Savings net of higher assessment costs of $32M over six years (including capital) are assumed in forecast. New LIFT assumptions have a large positive impact on forecast results all years. LIFT operations expected to be $1 million under budget FY09. In addition, self-insuring LIFT saves $1M a year net of additional costs.

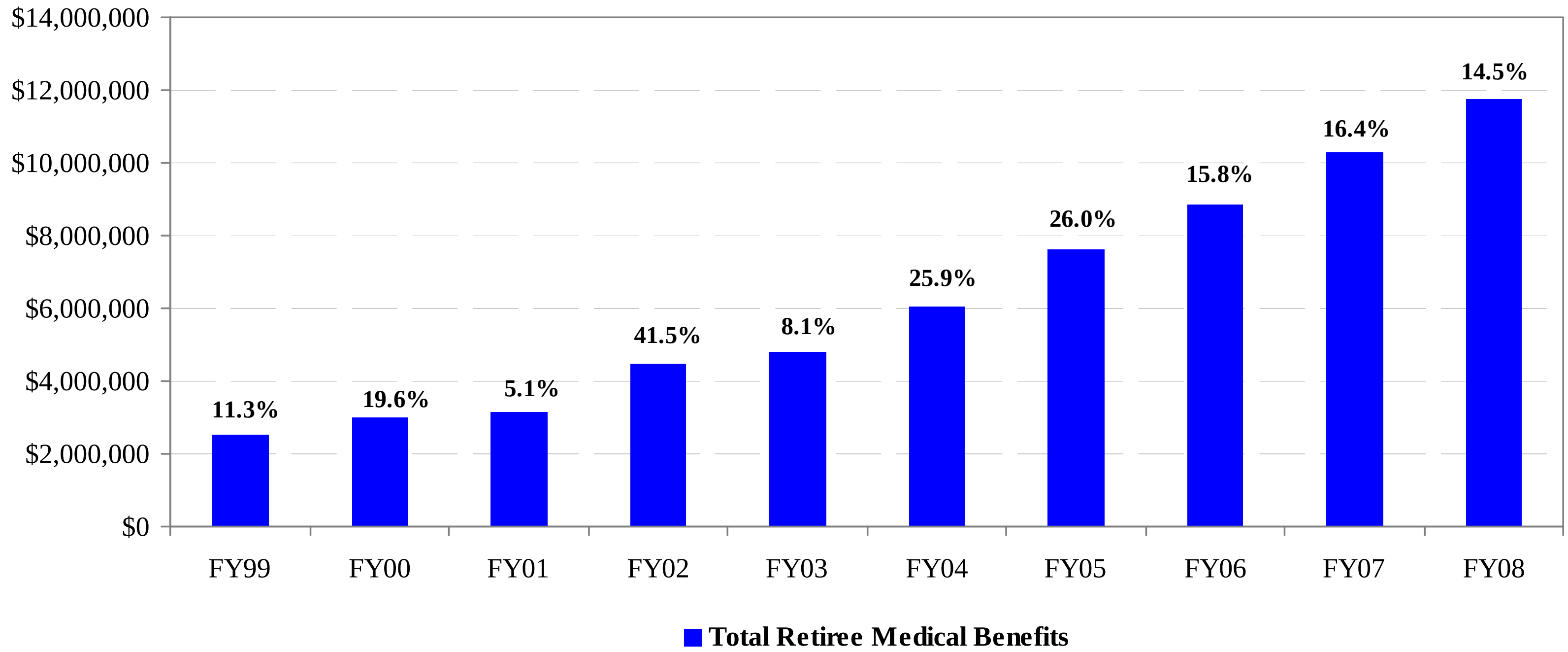


Health benefits costs (active employees) increase 12% or $4 + million each year. Costs per employee increased 12% annually last 10 years. Forecast is: 6.8% in FY10 and 12% per year thereafter. TriMet self insures, saving $2.5 million a year beginning FY11. Self insurance requires adequate cash reserves.

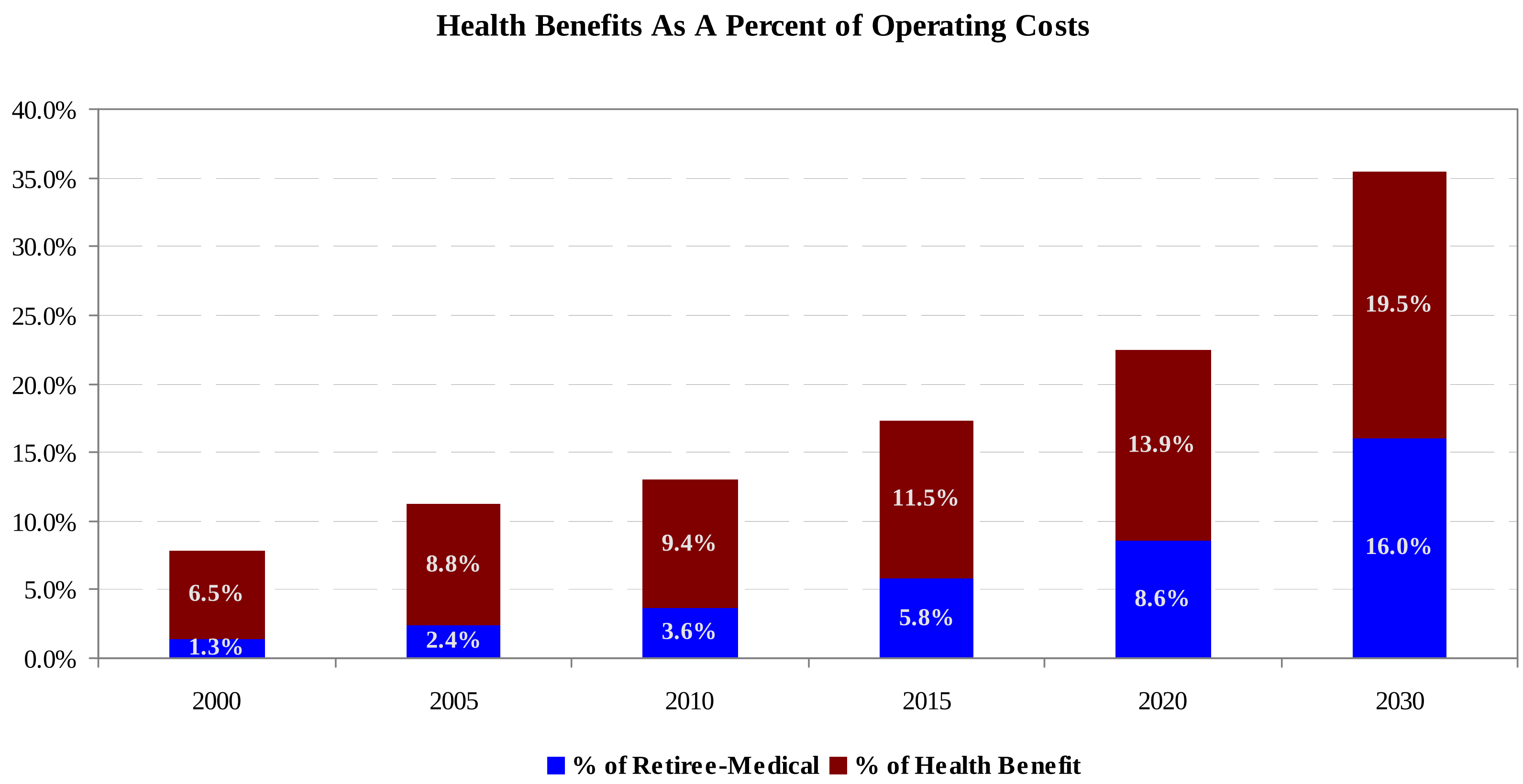


Retiree medical costs increased 18% a year last 10 years

Forecast: retiree medical costs increase 17% per year, the combined effect of plan rate changes and additional retirees. Approximately 520 employees, 20% of workforce expected to retire next five years. Average age at retirement = 62. Average years of service =27. **Retiree medical ARC = $57M**. FY09 estimated payout = $13.9M.



If trends are allowed to continue medical benefits costs will swallow an increasing percentage of the budget (9% in 2000 to 35% in 2030) requiring cuts to balance revenues and expenditures.



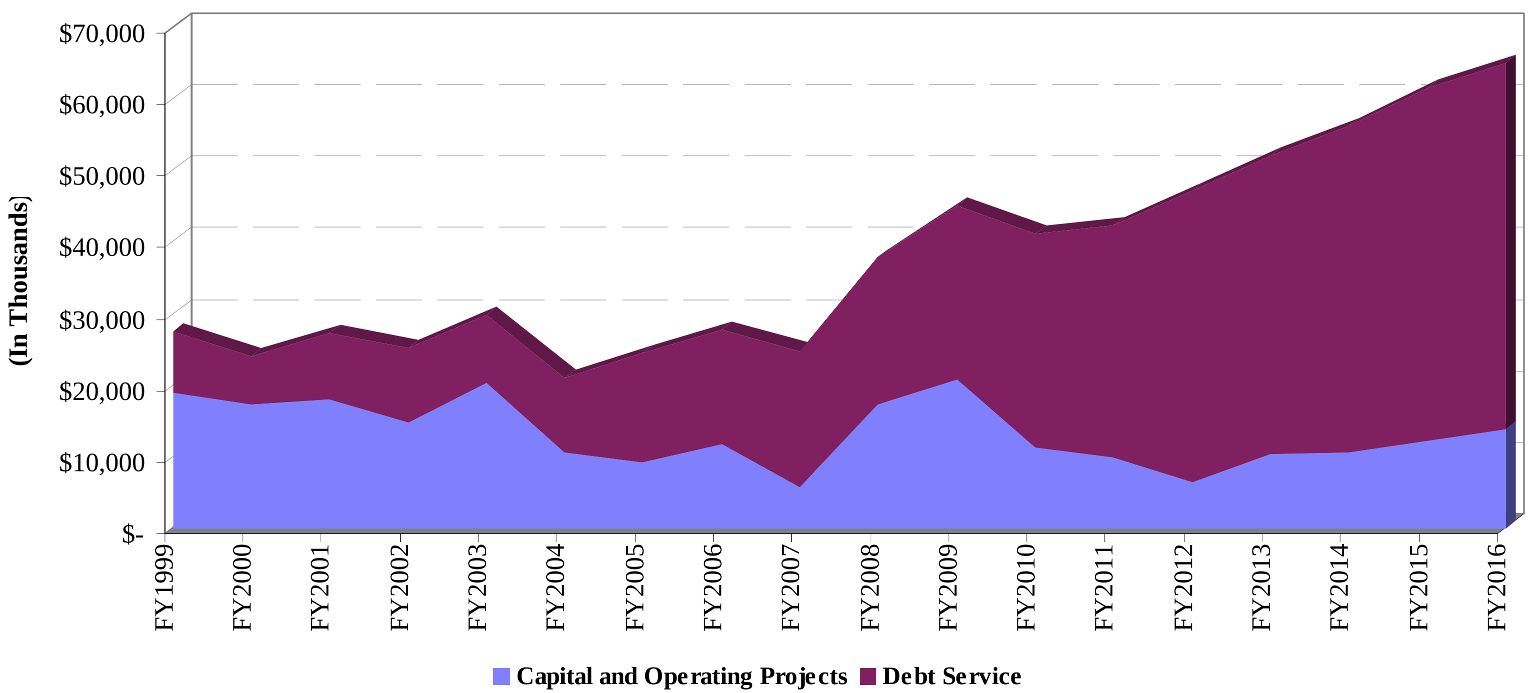
GASB No. 45 revealed the underlying un-sustainability of the retiree-medical benefit. The actuarial accrued liability (current service and past service) of the benefit is $632 million, 100% unfunded. Level funding of $57M is not affordable, nor is PAYGO as forecast results indicate. Reducing the cost and growth of this program will provide benefit security to more employees, protect union and management jobs and preserve service levels.

Benefit security can only be provided if benefits are sustainable. Possible cost savings measures:

- Changing retiree and or spouse contributions, deductibles or co pays
- Capping employer's annual obligation toward cost of coverage
- Changing age and or service retirement eligibility requirements
- Changing dependent eligibility requirements
- Change the program available for new hires
- Changing to a defined contribution plan

Debt issued annually to spread capital expenses over time.

Minimum required capital replacement and improvement. Debt service as a percent of operating cost is above TriMet's 5% benchmark most forecast years. Near term needs are great: Buses ($80M), Communications System ($41M), Fare System ($41M)

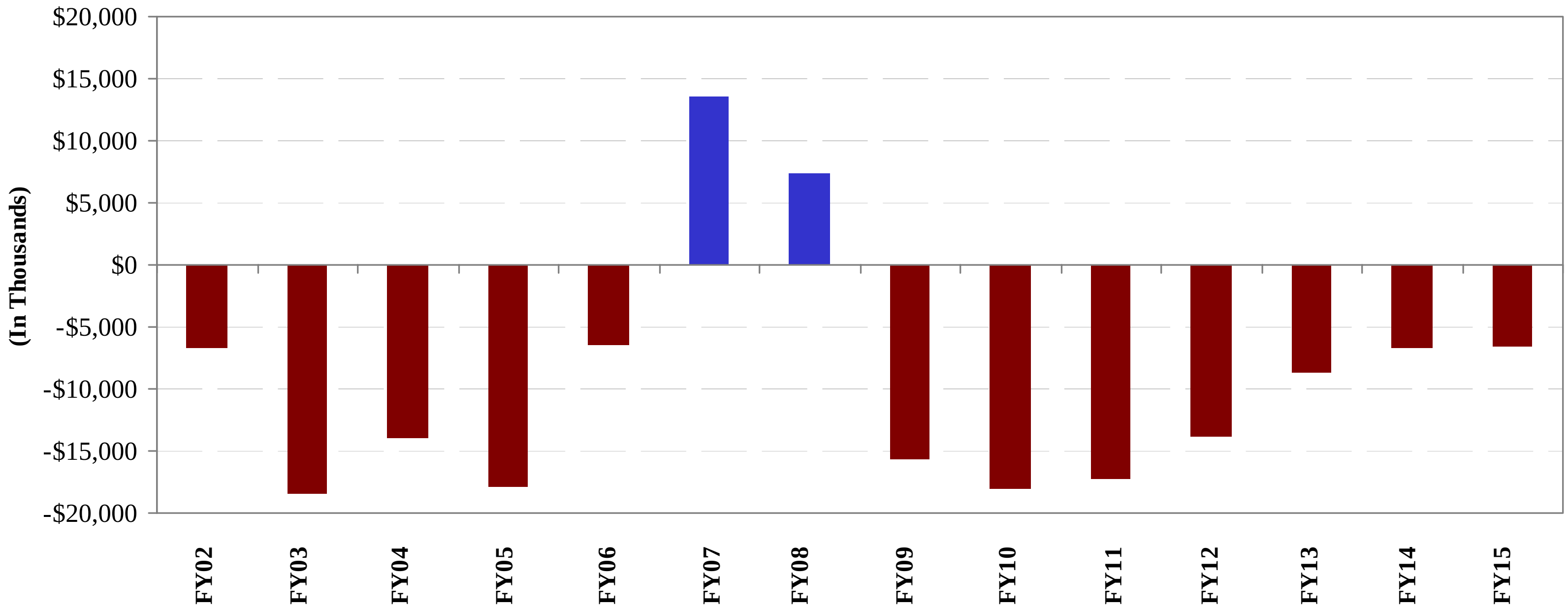


Other expenditure assumptions:

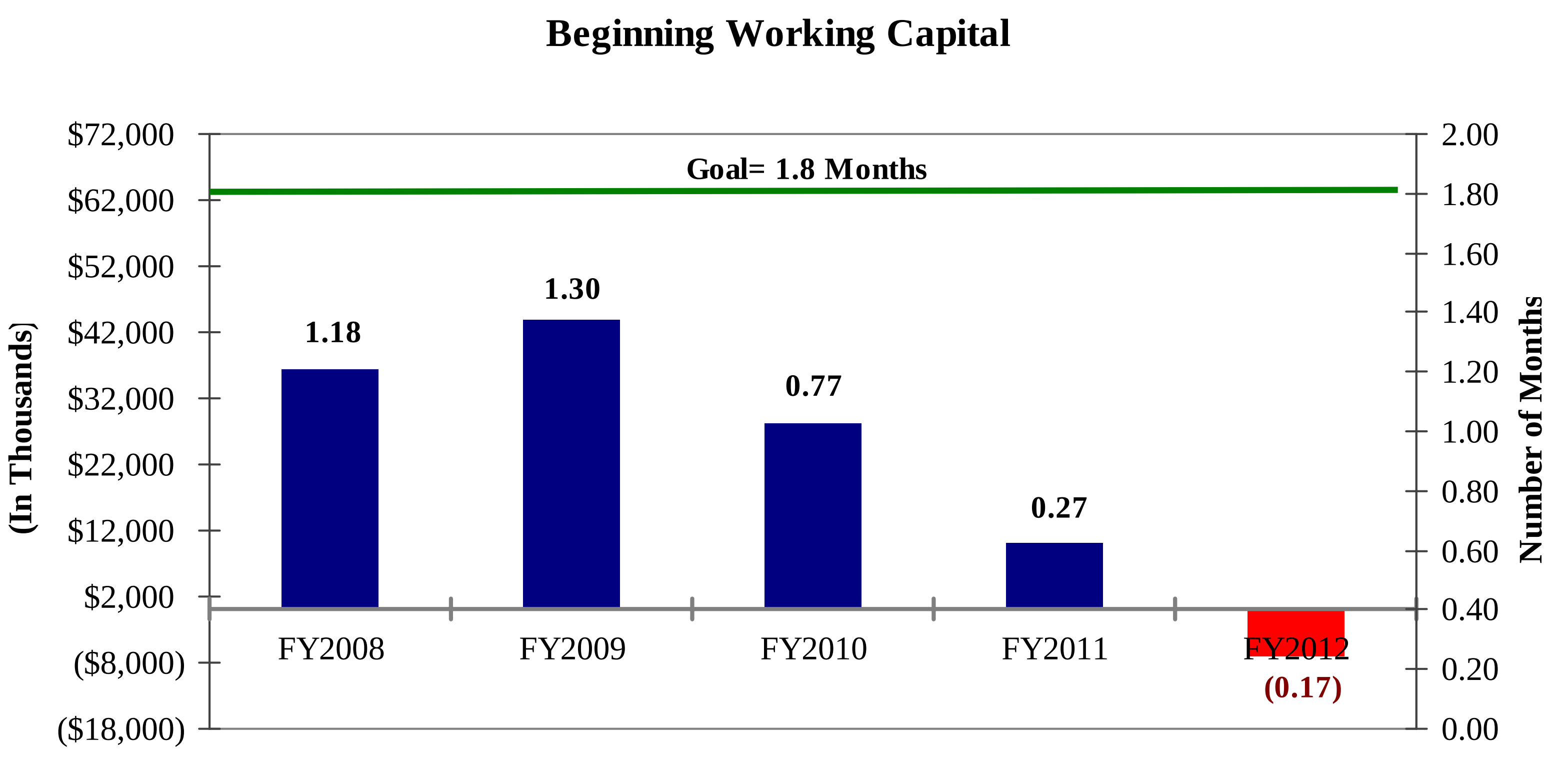
- Annual service bus and rail service increases to meet peak hour demand are assumed
- $1.3 million unbudgeted service increase assumed in forecast
- $. .9 million unbudgeted security improvements assumed in forecast
- $1.65 million unbudgeted debt service for Commuter Rail cost increases

Negative General Fund Results, Inadequate Cash Reserves, No Cushion.

Reserves too low to meet internal cash requirements without borrowing. Expenditures have been greater than revenues leading to repeated use of cash reserves to fund operations, just two years of positive operating margins out of seven. Forecast negative operating margins FY09 and subsequent years.



Cost reductions are needed to forestall fiscal instability.

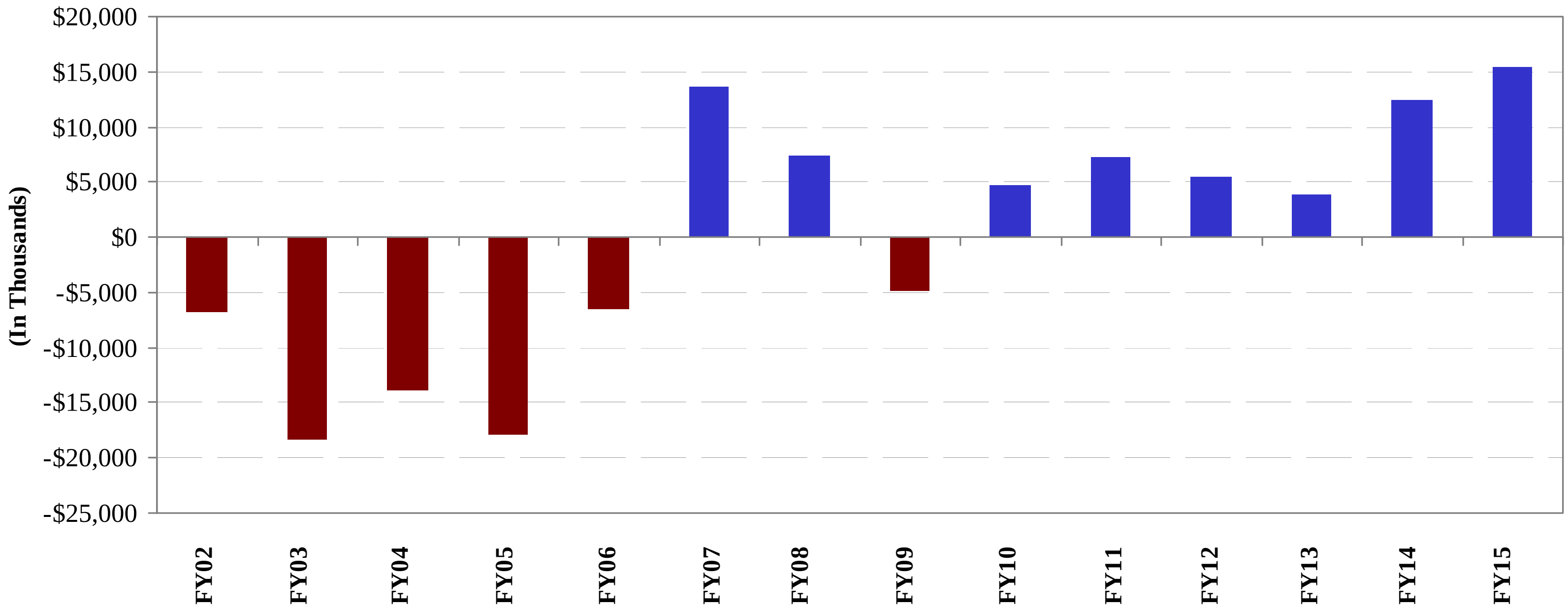


Recommendations to Achieve Fiscal Stability:

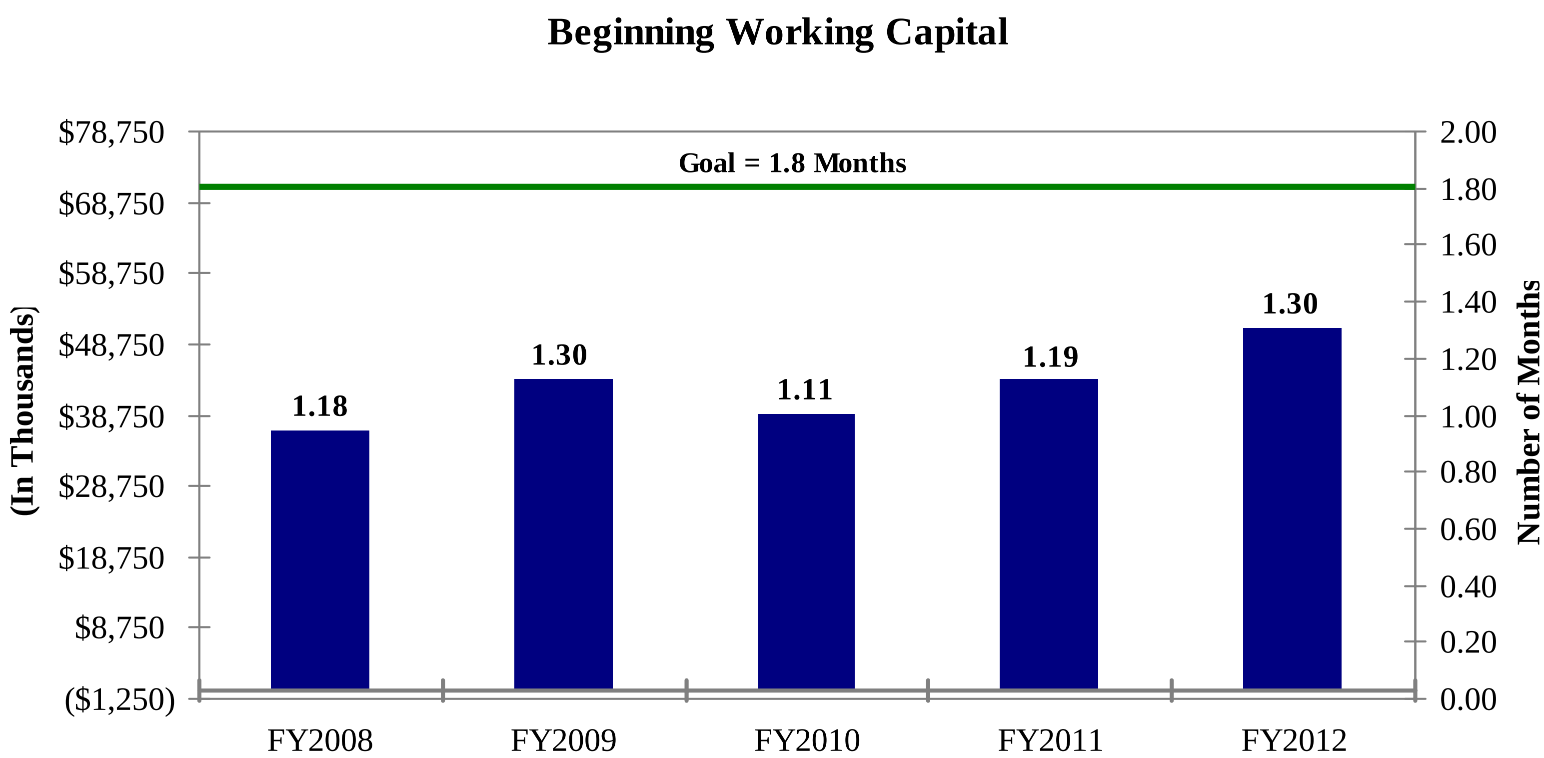
1. $13.5 million in continuing cost reductions from forecast, beginning in FY10, as much as possible without layoffs. Expected savings after accounting for passenger revenue losses are $11.5 million.
2. Additional (standby) service cuts to be identified in case budgeted reductions are not or cannot be made or revenues are lower than forecast.
3. No bus or rail service increases in FY10 and FY11 beyond Green Line. This means postponing Willow Creek improvements.
4. $5 million in capital program reductions in FY10 and $4.5 million in FY11.
5. No FY10 bus replacement, and move all scheduled replacements out one year. This reduction is the first that will be restored if new revenues materialize or TriMet's operating margins improve.
6. $1 million savings in LIFT from self-insurance
7. Assume LIFT savings in FY09 of $1 million, with future years growing from this lower base.
8. LIFT in-person assessments with LIFT conditional eligibility emphasis (assumed in forecast)
9. At the end of FY09, TriMet leadership will review the length of funding of the management and union DB pension unfunded liability to decide the period of funding.

Results-Solved Forecast

Solved Forecast General Fund Results



Solved Forecast Working Capital and Months of Operating Expense in Working Capital



1.0 Agency-wide Operating Finance Plan

1.1 Background–Financial Forecasting Process

This document presents the TriMet General Fund forecast assumptions and results through FY30. All capital and system operating expenditures, including TriMet's contribution to construction costs of projects like the Commuter Rail, I-205/Portland Mall LRT ("Green Line") and the proposed Portland-Milwaukie Light Rail and Columbia River Crossing projects are part of the forecast. System operating costs include the cost of operating and maintaining the existing transit system, projected increases in those costs, increases in fixed route service to maintain headways and capacity, additional service hours to meet the projected demand for LIFT and the operating cost of Commuter Rail, Green Line and the proposed Portland-Milwaukie Light Rail and Columbia River Crossing projects. The forecast includes capital and operating project expenditures from the agency's Capital Improvement Program.

The forecast document presents revenue and expenditure assumptions in detail and provides an explanation of each line on the forecast cash flow table.

Two forecasts are presented--an "Unsolved Forecast" and a "Solved Forecast". The Unsolved Forecast is based on current and historical spending and revenue patterns and assumes that current policies and practices remain largely unchanged. It includes capital projects as requested by staff in the Capital Improvement Plan.

Forecast assumptions are presented below in Sections 1.2 through 3.18. The assumptions presented in this report are for the Unsolved Forecast. Changes made to assumptions to achieve fiscal stability (the Solved Forecast) are noted throughout the document in bold.

<u>Summary of Results</u>. To continue to meet the needs of its region and commitments to its taxpayers, TriMet leadership has decided it must reduce the cost of operation and improve operating margins to maintain fiscal stability.

The needed cost reductions are caused by changes in the economy that are affecting businesses and households throughout the nation—an economy in recession, high and increasing medical benefits costs, steep stock market declines.

For the next fiscal year, the reductions identified by the General Manager are:

1. $13.5 million in continuing cost reductions from forecast, beginning in FY10, as much as possible without layoffs. Expected savings after accounting for passenger revenue losses are $11.5 million.
2. Additional (standby) service cuts to be identified in case budgeted reductions are not or cannot be made or revenues are lower than forecast.
3. No bus or rail service increases in FY10 and FY11 beyond Green Line. This means postponing Willow Creek improvements.
4. $5 million in capital program reductions in FY10 and $4.5 million in FY11.

5. No FY10 bus replacement, and move all scheduled bus replacements out one year. This reduction is the first that will be restored if new revenues materialize or TriMet's operating margins improve.
6. $1 million savings in LIFT from self-insurance
7. Assume LIFT savings in FY09 of $1 million, with future years growing from this lower base.
8. LIFT in-person assessments with LIFT conditional eligibility emphasis (assumed in forecast)
9. At the end of FY09, TriMet leadership will review the length of funding for the management and union DB pension unfunded liability to decide the period of funding.

The financial forecast was prepared as follows:

- Costs and revenues are projected on a fiscal year basis between FY08 and FY30 based on the assumptions described below.

- Annual costs are subtracted from the annual revenues for each fiscal year to determine that year's General Fund Result.

- The General Fund Result for each fiscal year is added to or subtracted from TriMet's Beginning Working Capital and Cash and Cash Equivalents to determine Beginning Working Capital and Cash and Cash Equivalents for the subsequent fiscal year.

- Funds in Beginning Working Capital and Cash and Cash Equivalents are expressed as a Percent of Operating Cost.

The detailed results illustrating TriMet system-wide operating and maintenance costs and revenues and capital costs in year of expenditure dollars between FY08 and FY30 are provided in Table 1. Table 1 contains 4 spreadsheets:

- General Fund Cash Flow FY08-FY30.

- Statistics FY08-FY30.

- Capital Fund Revenues and Expenditures FY08-FY30 (excludes I-205/Mall LRT Project and Commuter Rail Project Capital costs, except TriMet's General Fund share). The Capital Fund is part of the General Fund.

1.2 The Economy

The following section discusses the local economy, its current changing state, potential impact on near-term revenues and its long-term prospects.

The economy influences TriMet revenue and expenditures. Employment and population growth contribute significantly to passenger revenue and payroll tax revenue growth. Inflation contributes to price increases and is a component of revenue growth as well.

For the past four years, underlying growth in the Portland economy has been steady and strong.

	Portland CPI	Employment	Employer Payroll Tax (underlying growth, excludes growth from rate increase)
FY05	2.4%	2.9%	6.3%
FY06	2.8%	2.7%	9.8%
FY07	3.3%	2.7%	6.3%
FY08	3.8%	1.5%	5.1%

The collapse of housing prices, the crisis in the credit markets and now the collapse of stock market value continue to depress economic growth. While the Gross Domestic Product continued to grow through the second quarter of 2008, the consensus among economists is that we are now in a recession.

In the Portland region, calendar 2007 employment growth was a healthy 1.9%. Year over year, Portland area employers added an average of 16,000 jobs a month. Calendar 2008, the rate of employment growth has declined each month. October 2008 Portland area employment was down 1.5%, about 13,000 jobs lower than October 2007. In addition, Portland area unemployment increased 1 percentage point in October to 6%. By comparison, unemployment levels during the 2001-2003 recession were 8%.

Many believe this recession could last longer than the past several downturns because of differences in its origin and character. The recessions that began in 1981, 1991 and 2001 were caused by deliberate Federal Reserve policy aimed at reversing a rise in inflation. In those cases the Fed increased real interest rates until it saw the economic slowdown that it thought would move us back toward price stability. It then reversed course, reducing interest rates and bringing the recession to an end.

In contrast, a key cause of the present slowdown is not a tightening of monetary policy, but the turmoil in the financial markets caused by years of subprime lending, which artificially increased housing prices, followed by the collapse of the housing price bubble. Further, financial institutions borrowed too much and are unable to sustain their liabilities, let alone provide more credit so the economy can grow.

An International Monetary Fund study of 122 recessions around the world since 1960 found that recessions associated with housing busts or credit crunches were deeper than others.

While the Federal Reserve has been reducing interest rates aggressively, interest rate reductions have so far not been effective in stimulating the economy due to the unwillingness of banks to lend; interest rates haven’t risen as much as they would in a severe credit crunch, however. The Federal Reserve has also recently taken the step of directly lending to banks. In addition, Federal Reserve and Treasury programs to invest in troubled financial firms and support consumer lending will also help prevent greater slowdown of credit growth. To date the U.S. government bailout, including TARP legislation, financial institution rescues and loan guarantees totals about $7 trillion, half the total U.S. GDP.

Locally, ECONorthwest is projecting slower growth, but not a decline in the underlying rate of payroll tax revenue growth during the next three years—an economic slowdown that is as long as the 2001 recession due to its origins in housing depreciation and a credit crunch, but made somewhat less severe by Federal Reserve and Treasury actions.

The good news is that as economic growth slows down, the demand for oil is down as well. As a result oil prices are falling. Falling energy prices are helping to stabilize inflation as well.

While TriMet adjusts to current economic conditions, the long-term prospects for the Portland region remain strong. Global Insight, a national economic consulting firm, points out that knowledge workers are attracted to the area and businesses will follow the workforce they need.

Global Insight remarks that this region produced more jobs 2002-2007 than San Francisco, San Jose and Denver combined. Sectors of the economy expected to grow are: professional and business services, financial services, information services, construction, trade and transportation, education and health, government, leisure and hospitality. Source: Oregon Business July 2008. Metro's regional employment forecast for the TriMet area projects employment growth of 1.7% per year as well.

The following sections describe the variables and assumptions for each line of the forecast. The FY09 Adopted Budget, with adjustments explained below, provides the base year of the forecast. Future years are built from this starting point. FY08 revenues and expenditures are audited.

2.0 Operating Revenues

The sources of operating revenues are shown in Rows A through I on Table 1, Appendix A and are described below.

2.1 Passenger Revenues (Table 1, Line A)

Line A in the cash flow plan shows annual estimates of passenger revenues from the entire system, both from service existing at the start of the planning period and from new service put in place during the planning period. Passenger revenue forecasts are derived from forecasts of ridership and fares on bus, MAX, commuter rail, and LIFT services.

Passenger revenue is TriMet's second largest revenue source at 21% of operating revenues. In FY07, passenger revenues totaled $75.9 million, an increase of 10.9% over FY06. In FY08, passenger revenue was $80.8 million up 6.5% over FY07.

In 1990, TriMet implemented a policy of increasing fares with inflation and the forecast assumes a continuation of this policy, with inflation-adjusted fare increases each year FY09-FY30. In addition, TriMet has increased fares to offset high diesel fuel costs and to increase service.

Because TriMet has consistently adhered to its policy, passenger revenue growth has been strong. Last ten years, passenger revenues have grown at an average annual rate of 7.7%. During the same period, the CPI increased 2.8% per year. This is above-inflation revenue growth of 4.9% a year.

Above-inflation or real growth is important to TriMet because it provides funds that can be used to add services as the region grows or pay for costs that rise above inflation (such as ADA complementary paratransit, energy and medical costs).

A yearly build-up of the forecast of passenger revenues is provided in Table 3, Appendix A of this report. The following summarizes the basic approach:

A. Forecast of Fare Increases

After a moderate 3.4% increase in diesel fuel prices in FY07, TriMet budgeted $2.31 per gallon for diesel fuel in FY08. By the end of FY08, TriMet's fuel costs were $4.6 million over budget and fuel prices were increasing. TriMet budgeted $4.00 per gallon for diesel fuel in FY09 for a budget-to-budget increase in fuel costs of $13 million.

To partially cover the cost of $4.00 per gallon diesel fuel, TriMet raised adult fares $0.20 cash/$8.00 pass in September 2008. In addition, TriMet adjusted adult fares for inflation ($.05 cash/$2.00 pass) for a total fare increase of $0.25 cash/$10.00 pass in September 2008. Youth and Honored Citizen fares increased $0.10 cash/$2.00 pass. The TriMet Board approved the increase at their June 2008 meeting.

The fare increase was projected to cover $9.7 million of the $13 million additional cost.

In reaction to higher fares, TriMet expected overall ridership growth to slow to about 1% in FY09, the pattern observed after the FY05 and FY06 fare increases to offset rising diesel fuel costs. Instead fixed route ridership through October is increasing 7.7% year over year. Passenger revenue is projected to be 5% above budget in FY09.

In August and September 2008 fuel prices began to decrease. In addition, TriMet implemented two fuel-hedging transactions. TriMet's diesel fuel costs, including both fixed (hedged) and floating costs are expected to average $3.29 per gallon, $5.1 million under budget in FY09.

If current trends in fuel costs and ridership continue, revenues from the September 2008 fare increase will cover FY08's unbudgeted fuel costs of $4.6 million, FY09's costs and the $.6 million still uncovered by the 2006 fuel related fare increase. Due to the drop in oil prices, the forecast assumes TriMet will not increase fares September 2009.

The following table attributes past and future fare increases to whether they are regularly scheduled, for service or to offset diesel fuel costs.

Fiscal Year		Regularly Scheduled	Special Service	Diesel Fuel
FY99	$40,991	$0.05		
FY00	$46,373		$0.05	
FY01	$51,702	$0.05		
FY02	$53,191		$0.05	
FY03	$52,746			
FY04	$55,664	$0.05		
FY05	$59,487	$0.05		$0.05
FY06	$68,484	$0.05		$0.05, $.15
FY07	$75,931	$0.05		
FY08	$80,821	$0.05		
FY09	$93,532	$0.05		$.20
FY10	$104,399			

FY11 and beyond, fares are assumed to grow 3% per year with inflation throughout the forecast. This equates to $0.05/$2 adult fare increase every year FY11-FY14 and $0.10/$3-$4 almost every year FY15 -FY30.

B. Ridership Growth: MAX Service Blue, Red and Yellow Lines

Annual Blue, Red, and Yellow line ridership growth is estimated to be 3.7% in FY09 and 3% per year thereafter. After correcting for the addition of new lines, MAX ridership has historically grown 3% per year.

The extension of the Red Line to 185th September 2010 is expected to generate 330,000 annual rides. The additional passenger revenue that results is included in the forecast.

C. Ridership Growth: Bus Service

FY10 and beyond, bus ridership on existing services is forecast to grow 2% per year, slightly higher than Metro's projected long-term increase in regional employment of 1.7% per year[1]. Transit ridership is likely to increase faster than population or employment as road congestion worsens, and parking and fuel costs increase above inflation.

FY10 and beyond, bus service is increased 0.5% per year; generating 23 boardings per vehicle hour added, the average performance for recent service increases. The additional passenger revenue that results is included in the forecast. **Solved forecast: Bus service hours are not increased September 2010 or September 2011 reducing passenger revenue.**

[1] Excludes Wilsonville and Clark County.

D. Ridership Growth: Washington County Commuter Rail Service

Commuter Rail ridership is based on the Metro forecasts submitted to the Federal Transit Administration as part of the New Starts Rating process. First year ridership (FY2009) is forecast to be 1,976 daily boardings increasing 4.39% per year. Daily boardings are multiplied by 255 to arrive at annual ridership. FY09 ridership and passenger revenue are adjusted for the five months of Commuter Rail operation.

The average Commuter Rail fare is an estimated $1.62 at opening. An All-Zone fare will be required on Commuter Rail. The Commuter Rail average fare is higher than the average All-Zone fare because of an expected lower use of Commuter Rail by students and elderly, who receive discounted prices, and a lower pass use rate by commuter-only transit riders.

Commuter Rail service is expected to displace 246,256 annual TriMet bus boardings when customers switch from bus to the new Commuter Rail service. The resulting bus passenger revenue loss is accounted for in the forecast.

E. Ridership Growth: I-205/Portland Mall Light Rail (Green Line) Service

Green Line ridership is based on Metro's 2004 forecasts for opening year and FY30. Opening year, Green Line is projected to carry 25,250 daily boardings then grow 4.15% annually to FY30 when it carries 46,470 daily boardings. Green Line passenger revenue is based on projected ridership and

TriMet's light rail average fare. Annual ridership is calculated by multiplying forecast weekday boardings by 330 (historical MAX annual ridership divided by MAX weekday ridership). Green Line service is expected to divert 12,900 daily bus boardings to the new rail line when it opens. The resulting bus passenger revenue loss is accounted for in the forecast.

F. Ridership Growth: Portland-Milwaukie Light Rail Project Service

Portland–Milwaukie Light Rail service is based on Metro's 2008 forecasts for opening year and FY30. Opening year, Portland-Milwaukie Light Rail is projected to carry 21,548 daily boardings then grow 1.6% per year to FY30 when it carries 26,961 daily boardings. Annual ridership is calculated by multiplying forecast weekday boardings by 330 (historical MAX annual ridership divided by MAX weekday ridership). The average boarding fare for the Milwaukie project will be an estimated 12% lower than the average MAX fare as most of the stations on the line are in fare Zones 1 and 2. The average boarding fare multiplied by annual rides equals Milwaukie Light Rail passenger revenue. The new rail line will divert an estimated 1,366 daily bus boardings to Milwaukie MAX. The resulting bus passenger revenue loss is accounted for in the forecast.

G. Ridership Growth: Columbia River Crossing Project

Columbia River Crossing (CRC) Light Rail ridership is based on Metro's 2008 forecasts for 2016 opening year and FY30. Opening year, CRC Light Rail is projected to carry 13,800 daily boardings then grow 2.54% per year to FY30 when it carries 19,617 daily boardings.

Annual ridership is calculated by multiplying forecast weekday boardings by 330 (historical MAX annual ridership divided by MAX weekday ridership). The average boarding fare for the CRC is the same as the average MAX fare in the forecast. The average boarding fare multiplied by annual rides equals CRC Light Rail passenger revenue.

TriMet and CTRAN will share CRC operating costs and fares based on a formula that has not been determined. The forecast assumes TriMet receives 36% of CRC passenger revenues and pays 36% of CRC operating costs. The assumed cost and revenue share for the CRC project are for New Starts reporting purposes only. TriMet disputes the 36% cost and revenue share favored by CTRAN, and believes TriMet's share should be 16%.

At this time, new revenues, such as a payroll tax increase above the .7218 payroll tax rates are required for CRC operations.

H. Conclusions

The result of the above assumptions is passenger revenue growth of 6.9% per year between FY2008 and FY2030, slightly lower than TriMet's 7.7% average annual growth last ten years. The 7% growth rate includes annual fare adjustments for inflation, the impact of the September 2008 fare increase to offset high diesel fuel costs, plus passenger revenue from new I-205/Portland Mall Light Rail, Commuter Rail, and the proposed Columbia River Crossing and Portland-Milwaukie Light Rail service.

2.2 Other Operating Revenues (Table 1, Line B)

The "Other Operating Revenue" line item (Line B) accounts for a variety of smaller funding sources, some continuous and others one-time-only (OTO). A detailed forecast of these revenues is provided in Appendix A, Table 4, Lines 15-28.

Most sources of Other Operating Revenue are estimated to increase 3% per year throughout the forecast period. Notable revenue sources in this line item include:

Washington County contribution towards Commuter Rail operations. Under the Wilsonville to Beaverton Commuter Rail Project Definitive Grant Agreement between Washington County and TriMet, Washington County must make the following payments to TriMet for Commuter Rail operations, a total of $6 million, pro-rated for a partial first year. (Table 4, Line 21):

Fiscal Year	Washington County Contribution
FY09	$990,000
FY10	$2,000,000
FY11	$2,000,000
FY12	$1,010,000

City of Wilsonville contributions toward Commuter Rail operations are included. This contribution is capped at $300,000 a year for the first five years of operation and pro-rated for a partial first year; the contribution increases with CPI beginning FY14. (Table 4, Line 20).

Medical Transportation Program (MTP) and Waivered Non-Medical Transportation revenues: MTP revenues are used to fully pay the costs for the state's Medical Transportation Program (MTP). These revenues do not contribute to TriMet's general operating cash flow. Both revenues and expenditures grow 3.5% per year. (Table 4, Line 16).

This line also includes Title XIX funds and State Cigarette Tax funds TriMet receives to provide "waivered non-medical" rides on LIFT on behalf of Multnomah County Aging and Disability Services. These are rides to services and activities for case-managed individuals who would otherwise be in a nursing home. All of the individuals in this program would be LIFT eligible, so the program pays for rides that would otherwise be paid for by TriMet. Ride Connection operates the same program for Washington County and Clackamas County.

Advertising Revenues: Advertising revenues are expected to generate $4.5 million in FY09 and increase an average of 5.5% a year through FY12 under the terms of the TriMet advertising contract. In future years, advertising revenues increase 3% per year. The demand for advertising is cyclical. During the 2001-2003 recession, TriMet's advertising revenue dropped in from $3.3 million in FY02 to $1.9 million in FY06. (Table 4, Line 17).

Revenues from fiber optic space lease of $260,000 a year. The forecast assumes current lease will be renegotiated for another ten years at $260,000 per year. (Table 4, Line 18).

Revenues from the City of Portland reimbursing TriMet for Streetcar personnel costs are included in this line. TriMet's annual payment to Portland Streetcar, Inc. for its share of the cost of operations is included in the Streetcar budget. (Table 4, Line 26)

Revenues from the City of Portland reimbursing TriMet for Mall Maintenance are included in the line. The Portland Mall Management, Inc. (PMMI) agreement increases security and maintenance on the downtown Mall. In FY10, TriMet's contribution totals $1,076,000 a year. The City's funding of its $1,800,000 additional cost in the final plan is dependent on an on-street parking rate increase.

Should the rate increase not happen, planned expenditures will be decreased. TriMet will not increase its share. The final funding plan and FY10 budget is shown below. Only TriMet costs and revenues are included in the forecast: (Table 4, Line 22).

	Final Funding Plan	TriMet Budget 2009	TriMet Budget 2010	Difference 2009 - 2010
Expenditures	3,883,000	854,900	3,383,000	2,528,100
Revenues:				
Green Line Payment	-	345,000		(345,000)
Property Owners	500,000			-
City	2,307,000	500,000	2,307,000	1,807,000
TriMet	1,076,000	9,900	1,076,000	1,066,100
Total Revenues	3,883,000	854,900	3,383,000	2,873,100

Revenues from TriMet's reciprocal fare agreement with C-TRAN , the Vancouver, Washington transit agency, are included in Other Operating Revenues. Under the agreement, C-TRAN pays TriMet for C-TRAN pass and ticket fares used on TriMet's system and TriMet pays C-TRAN for TriMet pass and ticket fares used on C-TRAN's system. The revenues shown in Table 4, Line 15 are the net result of the above two calculations, indicating there are more CTRAN pass and ticket fares on TriMet than TriMet pass and ticket fares on CTRAN. No changes are assumed in the passenger revenue forecast that would increase or decrease this amount when the Columbia River Crossing begins operation. (Table 4, Line 15).

As an employer that provides a prescription benefit to Medicare eligible retirees, TriMet is eligible for Medicare Part D Drug Reimbursement. FY09 is the first year TriMet has been reimbursed by the program. (Table 4, Line 25).

Miscellaneous Revenues include a variety of revenues from year to year, generating $2.0-$2.5 million a year on average. (Table 4, Line 27).

2.3 Payroll Tax Revenues (Employer and Municipal) (Table 1, Line C)

Payroll taxes are TriMet's primary source of revenue for operations and are currently levied at 0.6618% tax ($6.618 per $1,000) on the gross payrolls of private businesses and municipalities within the district. The rate will increase to .6718% as of January 1, 2009. The payroll tax is dedicated to TriMet. The employer payroll tax is TriMet's largest source of operating revenue, accounting for 51% ($200 million) of FY08 operating revenues. Forecast payroll tax revenues are shown on a cash basis. Audit basis revenues are higher because they include an estimate of revenues earned but not received within the fiscal year.

The Oregon Legislature (HB 3037) gave the TriMet Board the authority to increase the payroll tax for employers and self-employed individuals from 0.6218% to 0.7218% over a ten-year period. The TriMet Board approved the increase at their August 11, 2004 meeting.

The payroll tax rate has been increasing by one-hundredth of a percent each year since January 1, 2005 and will stop increasing when the maximum 0.7218% rate is levied.

Revenues generated from payroll taxes at the 0.6218% rate, the rate just prior to the 10-year rate increase, are shown on Line C, Table 1 in Appendix A to illustrate the growth of the underlying payroll tax base. Revenues from the rate increases are shown on Line I, Table 1.

Payroll tax receipts are forecasted in two tiers:

<u>A detailed short-term forecast (three years into the future)</u>: TriMet purchases short-term economic and payroll tax revenue forecasts from ECONorthwest, a local economic consulting firm. ECONorthwest's forecast of total employer payroll tax revenues excluding revenues from the rate increases are shown in column B for FY08-FY11. The underlying rate of payroll tax growth, excluding rate increases, is shown in column C. The economic fundamentals behind the short-term forecast are explained in Section 1.2 above. The ECONorthwest payroll tax forecast for FY09 has been revised downward to 2% underlying growth for FY09 to reflect the worsening local economic conditions.

<u>For years beyond the short-term forecast, a trend forecast consistent with Metro's regional 2030 employment forecast and historic inflation and productivity growth rates.</u> The finance plan assumes a surge in underlying growth rates of 7% in FY12 and 9.5% in FY13 a pattern seen after past recessions, then uses an average annual growth rate for payroll tax receipts of 6.2% FY14 and beyond.

A	**B**	**C**
(000s)	Payroll Tax Base	% Change Underlying Base
Short-Term		
FY08	189,615	
FY09	193,407	2.0%
FY10	198,822	2.8%
FY11	205,155	3.2%
Long-Term		
FY12	219,458	7.0%
FY13	240,405	9.5%
FY14 and Beyond	255,310	6.2%

The payroll tax is a stable and growing revenue source. Except during recessions, when employment declines, this source grows at a rate greater than inflation, supplying real growth in revenues. Above-inflation or real revenue growth is important to TriMet because it can provide funds to add service as the region grows or pay for costs that rise above inflation (such as energy and medical costs).

There have been just two recessions in TriMet's history when payroll tax revenues declined (FY83 and FY02-FY03). The last recession began in this region July 2001 and ended 32 months later. For 32 months, employment in the region declined. Depending on the period looked at, between 30,000 and 50,000 jobs were lost in Multnomah, Washington and Clackamas counties. The recession hit this region and the West Coast particularly hard because of the huge employment correction that took place in the high tech sector. March 2004 marked the end of the recession. Post recession job growth in the region was 2.5% in FY04, 2.9% in FY05, and 2.7% in FY06 and in FY07.

How the Long-Term Growth Rate in the Employer Payroll Tax Revenues is Estimated. The underlying growth of payroll tax revenues is directly related to growth in employer payrolls within the district, which in turn is caused by employment growth, wage inflation, changes in job composition and productivity. Wage inflation generally corresponds to increases in the Consumer Price Index (CPI). Employment and productivity growth result in real (above inflation) growth in payroll tax revenues.

In its 2006 household and employment forecast (2005-2030), Metro is projecting TriMet area employment growth rate of 1.7% per year (see Volume II 2005-2030 Regional Population and Employment Forecast Public Review Draft May 2008). The 1.7% growth rate just includes the areas in the region in the TriMet district. Most economic forecasts predict 3% or lower long-term inflation. The 6.2% growth rate in payroll tax revenues FY12 and beyond is based on the following assumptions about regional employment, CPI and real income growth rates:

	2012-2030 Annual Growth Rate
Employment[2]	1.7%
CPI [3]	3.0%
Real income Growth[4]	1.4%
Total (1.017*1.03*1.014=1.062)	6.2%

By comparison, below are some average annual growth rates for tri-county payrolls, employment, CPI and real wages for selected periods. During these time frames, there was one recession during which year-over-year payroll tax receipts declined (FY02-FY03). The payroll and employment data is for the tri-county area from the Oregon Employment Department. The CPI is Portland Wage Earners and Clerical Workers.

1990-2006	
Tri-County Payrolls	6.09%
CPI	2.69%
Employment	1.95%
Real Wage Growth	1.45%
1985-2006	
Tri-County Payrolls	6.69%
CPI	2.96%
Employment	2.59%
Real Wage Growth	1.14%
1986-2006	

[2] Source: Metro 2005-2030 Regional Forecast
[3] Source 1983-2007 Portland average=3.0%
[4] Source: 1990-2006 national average was 2.2%, Bureau of Labor Statistics, non-farm productivity

Tri-County Payrolls	6.70%
CPI	3.03%
Employment	2.58%
Real Wage Growth	1.09%
1987-2006	
Tri-County Payrolls	6.68%
CPI	3.00%
Employment	2.53%
Real Wage Growth	1.15%
1984-2006	
Tri-County Payrolls	6.64%
CPI	2.99%
Employment	2.59%
Real Wage Growth	1.06%
1988-2006	
Tri-County Payrolls	6.47%
CPI	2.76%
Employment	1.97%
Real Wage Growth	1.40%
1989-2006	
Tri-County Payrolls	6.29%
CPI	2.84%
Employment	2.14%
Real Wage Growth	1.31%
1993-2006	
Tri-County Payrolls	6.07%
CPI	2.53%
Employment	2.01%
Real Wage Growth	1.53%

Based on Metro's projections, the forecast assumes a lower rate of regional employment growth than historical experience. Building upon Metro's employment projection of 1.7% annual growth, and assuming 3.0% inflation and 1.4% productivity as a surrogate for real wage growth (productivity growth nationally has averaged 2.2% per year since 1990) results in the 6.2% growth rate assumed in the forecast.

New revenues from increases in the payroll tax rate are discussed in the section for Line I below. Exhibit 2 in Appendix B provides historical information on the TriMet employer payroll tax.

2.4 Self-Employment Tax Revenues (Table 1, Line D)

In addition to the payroll tax, TriMet levies a 0.6618% tax on the net income earned within its district by self-employed individuals. Self-employment tax revenues increased at an average annual rate of 5.2% between FY90 and FY08. This tax rate will also increase to 0.6718% on January 1, 2009. Revenues from this tax are shown in the forecast on a cash basis.

As the historical data on self-employment revenue in Exhibit 2 Appendix B illustrates, revenues from this source tend to increase at very high rates during times of economic growth and during recessions decrease more than the employer payroll tax.

Self-employment tax revenues increased 19.8% in FY06 (up $2 million) and 21.3% in FY07 (up another $2 million) after strong growth of 6.9% in FY04 and 9.5% in FY05. This is similar to the pattern seen in these growth rates between 1986 and 1991 following the 1983 recession.

Self-employment tax receipts are forecast in two tiers:

- A detailed short-term forecast (three years into the future): TriMet purchases short-term self-employment tax revenue forecasts from ECONorthwest. Their short term forecast is used in the finance plan for FY09-FY11, as shown in the table below.

- For years beyond the short-term forecast, a trend forecast consistent with Metro's regional 2030 employment forecast and historic inflation and productivity growth rates. The finance plan uses an average annual growth rate for self-employment tax receipts of 5.2%, the 1990-2008 average growth rate.

Forecast self-employment tax revenues (excluding revenues from the increase in the tax rate) are shown below. FY09-FY11 incorporates ECONorthwest's short-term forecast. The economic fundamentals behind the forecast are explained in Section 1.2 above.

(000s)	Self-Employment Tax Base	% Change Underlying Base
Short-Term		
FY08	11,200	
FY09	10,976	-2.0%
FY10	11,163	1.7%
FY11	11,531	3.3%
Long-Term		
FY12	12,131	5.2%
FY13	12,761	5.2%
FY14 and Beyond	13,425	5.2%

New revenues from the increases in the self-employment tax rate are discussed in the section for Line I below.

2.5 **State-In-Lieu of Tax Revenues** (Table 1, Line E)

State of Oregon government offices located within TriMet's district boundaries are not subject to the municipal payroll tax. Instead, they make in lieu of tax payments to TriMet based on 0.6218% of their gross payrolls. Between FY83 (when the program was instituted) and FY95 the growth rate of state in lieu receipts was 8.24% per year. In the next two fiscal years there were substantial decreases in these receipts due to the conversion of Oregon Health & Science University (OHSU) from a State agency paying in-lieu of tax to a local government employer paying payroll tax. After the conversion of OHSU from state to local government employer, the growth rate for state in lieu receipts has averaged 5.0% per year.

As with payroll and self-employment tax receipts, state in lieu receipts are forecasted in two tiers:

- A detailed short-term forecast (three years into the future): TriMet purchases short-term forecasts of state in lieu receipts from ECONorthwest. Their short term forecast is used in the finance plan, as shown in the table below.

- For years beyond the short-term forecast, a trend forecast consistent with Metro's regional 2030 employment forecast and historic inflation and productivity growth rates. The finance plan, shown in Appendix A, uses an average annual growth rate for state in lieu receipts of 5.0%, the 1997-2007 post-OHSU conversion growth rate.

Forecast state in lieu revenues are shown below. FY09-FY11 incorporates ECONorthwest's short-term forecast. The economic fundamentals behind the forecast are explained in Section 1.2 above.

(000s)	State In-Lieu	% Change Underlying Base
Short-Term		
FY08	2,215	
FY09	2,231	0.7%
FY10	2,351	5.4%
FY11	2,459	4.6%
Long-Term		
FY12	2,582	5.0%
FY13	2,711	5.0%
FY14 and Beyond	2,847	5.0%

2.6 Operating Grants and Operating Project Grants (Table 1, Line F)

Line F addresses a variety of grants reimbursements from local, state and federal sources. A detailed build-up of the forecast of these grants is provided in Appendix A, Table 4, Lines 1-14.

A. Federal Formula Grants

SAFETEA-LU Reauthorization

The Safe, Accountable, Flexible and Efficient Transportation Equity Act-A Legacy for Users (SAFETEA-LU), which authorizes funding for the Federal Highway Program and the Federal Transit Program will expire September 30, 2009.

When the last transportation authorization act (TEA-21) expired on October 1, 2003, the Federal Transit Program and all other federal surface transportation programs continued to operate on the basis of eleven short-term extension acts until August 10, 2005 when SAFETEA-LU was signed into law.

The upcoming surface transportation program reauthorization will likely be even more difficult than the last because continuing the program at today's levels will require a significant increase in the federal gas tax or other source of additional tax revenue.

TriMet is keenly interested in the outcome of both the highway and transit programs:

Today TriMet receives about $45 million in federal transit program formula funds, which are used to support operations. In addition, we receive about $11 million dollars a year in federal highway program funds through the Surface Transportation Program and Congestion Mitigation Air Quality programs to support the regional rail program, passenger amenities improvements and the Regional Transportation Options program. Federal funds constitute about 15% of TriMet's operating revenues.

When Congress authorized SAFETEA-LU at $286.5 billion in 2005, it was expected that revenues flowing into the Highway Trust Fund (the Mass Transit Account is in the Highway Trust fund) would be sufficient to support the program through its final year. While it was expected that outlays would exceed incoming revenues by $5 billion, Congress estimated that the program would remain solvent long enough for other measures to generate the revenues necessary to sustain the program at the levels authorized in SAFETEA-LU, as revenues accumulated in the Highway Trust Fund during prior authorizations would be used to fully fund SAFETEA-LU.

As for the next reauthorization, highway program fuel tax revenues will be significantly less than needed for on-going expenditures, requiring a 5-8 cent gas tax increase by the end of FY09 (September 30, 2009) to keep the program funded. Mass transit program fuel tax revenues will be significantly less than needed for on-going expenditures, although the date of insolvency is later, circa late 2010 or 2011.

Each penny of federal fuel tax generates $1.7 billion. Transit receives 20% of gas tax revenues or $350 million per penny, about $6.5 billion a year. The FY08 federal Transit Program was $9.4 billion, with $1.6 billion from General Funds, which support the New Starts Program, Research and FTA Administration and $7.8 billion from the Mass Transit Account of the Highway Trust Fund.

On an on-going basis, mass transit gas tax revenues are significantly less than needed to support on-going expenditures at today's levels, requiring a 11-14 cent fuel tax increase to keep the program funded at FY09 levels, if Congress wants to take the $2 billion New Starts program out of the General Fund, and a 6-11 cent fuel tax increase if not. The higher rates assume the program grows 6% per year, the lower rates assume 3% growth.

The fuel tax today is 18.6 cents; transit's share is 2.86 cents To keep the surface transportation program whole (both highways and transit) will require a roughly a doubling of the gas tax at a minimum, and more to grow the program.

Without an increase in the fuel tax or other source, current rates would fund the highway program at 2006 levels and transit at 2003 levels (a loss of $12 million TriMet revenues).

The state gas tax is also an issue for transit, as $10 million a biennium, or 66% of the State elderly and disabled transportation program is funded with state Surface Transportation Program funds, as is the $4 million a biennium Mass Transit bus replacement program. State gas taxes have been declining, possibly pressuring the state to keep more of the state STP funds should the legislature not increase the state gas tax. ODOT does not expect a shortfall until 2011, however.

Section 5307 Urbanized Area formula funds and Fixed Guideway Modernization (Table 4, Lines 2 and 3) are TriMet's primary federal formula grants. When the current authorization ends at the beginning of FY10, the forecast assumes revenues grow 3% per year, no change from past forecasts. The underlying assumption is that Congress adequately funds the federal Surface Transportation Program in future years and provides a modest inflation adjustment annually.

	Section 5307	**% Change**
FY04	$26,309,320	
FY05	$28,162,667	7.04%
FY06	$27,571,836	-2.1%
FY07	$29,630,579	7.4%
FY08	$31,419,385	6.0%
FY09	$33,417,193	6.4%
FY10	$34,419,708	3.0%
FY11	$35,452,300	3.0%
FY12	$36,515,869	3.0%

TriMet's Fixed Guideway Modernization funds increased 89.4% or $3,547,000 in FY06, when the Westside light rail entered its eighth year of operation and became eligible to receive Fixed Guideway Modernization funds. Through FY2011, this source is forecast using the change in TriMet's fixed guideway vehicle miles as a percentage of the national fixed guideway vehicle miles for the eight preceding years. The formula includes the addition of the Airport LRT extension and Portland Streetcar in 2001, and Interstate MAX in 2004, which results in revenue increases to TriMet in FY09 and FY12, respectively.

Because the New Starts program has increased national fixed guideway vehicle miles faster than the Fixed Guideway Modernization funding program has grown, the funds in the program are not expected to increase commensurately with TriMet rail service growth. After FY12, Fixed Guideway Modernization funds increase 4% annually. Revenues increase an additional $1.5 million in 2016 when Commuter Rail enters its eighth year of operation, $1.5 million in 2017 when Green Line enters its eighth year of operation, and $1.5 million in 2023 when Milwaukie LRT enters its eighth year of operation.

	Fixed Guideway Modernization	**Percent Change**
FY05	$3,965,742	
FY06	$7,512,740	89.4%
FY07	$8,508,419	13.2%
FY08	$9,383,075	10.3%
FY09	$9,758,398	4.0%
FY10	$10,734,328	10.0%
FY11	$11,163,607	4.0%
FY12	$11,721,788	5.0%

The Job Access Reverse Commute program provides approximately $600,000 a year to TriMet via formula to provide transportation for low-income individuals. Match for JARC is 50% local for operating and 20% local for capital. Grant match can be in-kind (i.e. service increases to low income areas). Funds offset a like amount of additional service. TriMet's Job Access program funds a variety of community based transportation providers. Revenues are offset with a like expenditure each year of the forecast. (Table 4, Line 9).

The New Freedom program funds service improvements that address the transportation needs of persons with disabilities beyond those required by the Americans with Disabilities Act. TriMet receives about $400,000 a year. The funds are assumed in the forecast, with an additional offsetting cost, beginning in FY08. Match for New Freedom funds is 50% local for operating and 20% local for capital. Grant match can be in-kind (i.e. service increases for people with disabilities). TriMet's New Freedom revenues fund community-based transportation services for elders and people with disabilities through Ride Connection. (Table 4, Line 11).

B. MTIP and STIP Funds

The following operating funds, which are incorporated in the finance plan, were provided to TriMet by Metro, the Metropolitan Planning Organization (MPO) through the Metropolitan Transportation Improvement Program (MTIP). MTIP funds are Highway Program funds, either Congestion Mitigation or Air Quality (CMAQ) or Surface Transportation Program (STP) funds, which are by law flexed by state transportation agencies to MPOs for competitive distribution to road and transit programs. The forecast assumes that Congress adequately funds both the federal highway and transit programs in future years and provides a modest inflation adjustment annually.

Occasionally, TriMet participates in funding exchanges that are approved by the region and the TriMet board. Funding exchange revenues have no financial impact on the district as funds are offset by a cost of the same amount. Two funding exchanges are recorded in FY08 and FY09. (Table 4, Line 6).

$86.4 million of STP funds from Metro will be provided over FY06-FY15 to offset by a like amount of mid-term and short-term debt expense for the regional rail program (Metro Resolution No. 04-3468). These funds are committed in an Intergovernmental Grant Agreement with Metro. TriMet issued the GARVEE bonds June 2005. The offsetting debt service is shown on Table 13, Line 12.

Pending approval following a public comment period, in Metro Resolution No. 08-3492, Metro endorsed supplementing the multi-year commitment of Metropolitan Transportation Improvement Program (MTIP) funds for the region's high capacity transit program that was last approved by Resolution No. 04-3468. MTIP funds include urban Surface Transportation Program (STP) and Congestion Mitigation Air Quality (CMAQ) funds allocated by formula or agreement to the Portland metropolitan region. Between 2012 and 2025, Metro will provide $144.8 million to fund debt service or financing for $13.3 million in 2008 dollars for the Wilsonville-Beaverton Commuter Rail Project and $72.5 million in 2011 dollars for the Portland-Milwaukie Light Rail Project. This supplements the $74.4 million that remains to be provided for the regional rail program under resolution No. 04-3468. (Table 4, Line 5).

Debt service will be structured so that principal and interest can be fully paid with the multi-year commitment of MTIP funds. TriMet will pay Commuter Rail expenses with General Funds and use $13.3 million of CMAQ funds to replace buses in 2011. The offsetting debt service is shown on Table 9, Line 11.

Metro will provide CMAQ funds (and the related expenses) for TriMet's Transportation Demand Management program, through the Metropolitan Transportation Improvement Program (MTIP) process. (Table 4, Line 1).

Additional Grant and Capital Revenues

The following federal revenues from state programs are assumed in the plan:

Project reimbursement for Startup and Force Account costs for Green Line and Commuter Rail are included. These are offset by a like amount of expense, so they do not impact the TriMet General Fund. (Table 4, Line 8).

Funds from the state Special Transportation Fund (STF) discretionary grant program for elderly and disabled transportation are assumed for RideWise program, growing 3% per year. This program, which provides $13 million each biennium statewide, is a source of funds for RideWise as well as a handful of other elderly and disabled transportation services and vehicles. (Table 4, Line 13).

Solved Forecast: TriMet reduces its exposure to an MBIA bankruptcy by terminating the 2005 light rail car lease agreement and bringing both the revenue and the lease payments in house (Table 4, Line 7). The lease payments are included in the debt service line of the forecast.

No economic stimulus funds are assumed.

2.7 Capital Grant Resources (Table 1, Capital Fund, Line 4)

Due to administrative ease of using capital grant funds for preventive maintenance, most federal formula grants are now used as such and appear in Line F, Grants and Capital Reimbursement. However, there are several other grants that are provided to TriMet expressly for capital improvements and purchases.

These include:

$625,000 per year from the State of Oregon for bus acquistion. TriMet received $580,000 from this on-going state program for mass transit bus replacement in the FY03-FY05 biennium, $1.3 million in the FY05-FY07 biennium and $1.5 million in the FY08-10 biennium. (Table 5, Line 1).

Appropriations from the ODOT's Special Transportation Fund (STF) discretionary grant program for Accessible Transportation (LIFT) vehicles. TriMet received $4.75 million from this program for FY08 and FY09, but can expect far less in the future. Each biennium, about $5.3 million STF funds are distributed to TriMet, Ride Connection, Sandy Transit, Canby Area Transit, SMART and the South Clackamas Transportation District via a competitive grant process. (Table 5, Line 2)

A forecast of STF revenues and the costs of the programs currently funded with these revenues (i.e. TriMet LIFT vehicle replacement, Ride Connection vehicle replacement, RideWise, other Ride Connection programs, preventive maintenance, Sandy Transit, SMART, CAT and SCTD service and vehicle replacement) show a $2.0 million - $2.5 million annual shortfall. The reason for the shortfall is this revenue source does not keep pace with inflation, while transportation costs are rising and the bill is coming on Ride Connection and rural transit district vehicle replacements.

The Governor's 09-11 budget includes a recommendation for a 2.5-cent cigarette tax increase, estimated to generate $5 million a year statewide. The TriMet STF area's share would be about $1.75-$1.9 million to be distributed to the five area transit districts and Ride Connection. If the cigarette tax increase is approved by the Legislature, it should first be used to offset the current shortfall in the program, then can be distributed to either new programs or additional TriMet vehicle replacement. The forecast does *not* assume the new revenues are approved. If approved, General Fund Results (Table 1, Line AC) may improve by about $.5 million a year.

Annual CMAQ/STP grants of $1.3 million for bus shelter and Streamline improvements through the MTIP process. These funds are forecast to grow with inflation after FY09. These funds are offset by the program's costs shown in Table 12, line 34. Should the region decide in the future to not continue funding this program, the expenditures would be cut back. (Table 5, Line 7).

Department of Homeland Security. These fund a series of TriMet system security improvements included in the Capital Improvement Plan. Through FY09, Department of Homeland Security funds do not require local match, but agencies electing not to match DHS funds must reduce their FY08 and FY09 DHS awards by 20%. TriMet has elected to take the reduction. The security projects would be unaffordable for TriMet without the DHS funds. (Table 5, Line 6).

Connect Oregon II funds awarded for the redevelopment of the 188th Street MAX LRT Station. (Table 5, Line 18).

$1 million CMAQ funds awarded by Metro to retrofit buses with Continuously Regenerating Trap technology are included. (Table 5, Line 16)

The SAFETEA-LU earmark to build Gresham Civic Station is included. Match is provided by Metro. (Table 5, Line 14).

Reimbursement from the City of Portland for Steel Bridge repairs is included (Table 5, Line 10). These funds are committed in an inter-governmental agreement between TriMet and the City.

Washington County's contribution to Commuter Rail capital cost increases. (Table 5, Line 5). Under terms of the Wilsonville to Beaverton Commuter Rail Project Amended Definitive Intergovernmental Grant Agreement Between TriMet and Washington County, the County and TriMet are each responsible for 50% of costs over budget. In Resolution 08-3942 Metro has committed MTIP funds between 2012 and 2026 to TriMet to provide bond payments for $13.3 million to offset Commuter Rail cost increases. By agreement, Washington County will include in its annual payment for Commuter Rail operations, discussed above, payment for its share of cost increases divided over 4 years with 4.5% interest, beginning in FY09.

The following table illustrates the resulting TriMet and County shares of the project overruns.

Project Total	$163,100,000
Original Budget	$117,300,000
Cost Increases	$45,800,000
TM Admin and County Property	($5,000,000)
MTIP Revenues	($13,300,000)
Net Overruns	$27,500,000
TriMet Share	$13,750,000
County Share	$13,750,000

Because the flow of MTIP funds, which will offset debt service costs of a previously planned revenue bond for TriMet bus replacements do not begin until 2012 and extend through 2026 and because the County will pay its share over four years between FY09 and FY12, to keep General Fund working capital stable, TriMet will use current authority to issue revenue bonds to pay for a portion of the cost overruns and reduce the impact on working capital. In addition, TriMet will move the FY10 and all future planned bus replacements out one year.

Year-by-year forecasts of capital program grants are provided in Appendix A, Table 5.

2.8 **Interest Earnings** (Table 1, Line G)

TriMet earned 5% on investments in FY07, 4.1% in FY08 and expects to earn 3.0% in FY09 and 4.0% thereafter. Interest earnings do not include earnings on the local share light rail project revenues, which are restricted in use to capital expenditures. Interest earnings on bond revenues are contributed to the bonded project's costs.

2.9 **Accessible Transportation Program (ATP) Funds** (Table 1, Line H)

Funds incorporated in this line item come from state and federal sources and are dedicated to LIFT accessible transportation. A detailed build-up of these revenues through FY30 is provided in Appendix A, Table 5, Lines 30 and 31.

ODOT allocates <u>state cigarette tax</u> proceeds appropriated to the Special Transportation Fund (STF) to transit districts and counties by formula. These funds are estimated to decline two percent per year throughout the forecast. (Table 5, Line 30).

TriMet also receives <u>Federal Title XIX funds</u> through the State to pay for door-to-door LIFT service for work trips for developmentally disabled individuals. These funds are estimated to increase 4.5% per year as cost reimbursement is tied to increases in the LIFT cost per ride. (Table 5, Line 31).

2.10 **Additional System Revenue: Payroll Tax Rate Increase** (Table1, Line I)

The Oregon Legislature gave the TriMet Board the authority to increase the payroll tax for employers and self-employed individuals from 0.6218% to 0.7218% over a 10-year phase-in period. The TriMet Board approved the increase at their August 11, 2004 meeting. The payroll tax rate will increase one-hundredth of a percent each year for 10 years, beginning January 1, 2005. Line I includes estimated new revenues from both the employer payroll tax and the tax on self-employed individuals. The forecast uses the base growth rates explained in Sections 3.3.4 and 3.3.5 above.

Table 2, Appendix A, illustrates new services included in the forecast that will be paid for (or partially paid for) with new revenues. It also illustrates estimated revenues attributable to the rate increase.

New revenues pay for new services. The rail projects' contribution to the on-going revenue and expenditure imbalance is marginal, except for the impact of Commuter Rail cost increases on TriMet's FY09-FY12 cash reserves and debt service. Approximately two–thirds of Commuter Rail overruns are paid back to TriMet by Metro and Washington County by FY12, however.

2.11 Total Continuing Revenues (Appendix A, Line J)

Based on the principles and assumptions described above, total continuing revenues, including the payroll tax increase, are projected to grow 5. 7% annually between FY08 and FY30.

3.0 System Operating, Maintenance and Capital Costs

3.1 Overview

Framework: System Operating, Maintenance and Capital Costs are forecast in two categories:

- Costs of transit services that currently exist and that continue in the future
- Costs of transit services that are projected to begin in the future

This section addresses operating expenses associated with bus and rail services existing at the start of the forecast period (which are shown in Table 1, Lines K-R). Operating expenses from new fixed route bus and rail service put in place during the planning period are shown in Table 1, Lines U-Z.

The FY09 Adopted Budget, with adjustments if needed, provides the base year of the forecast. Future year expenses are estimated from the resulting starting point.

Forecast assumptions below are for the Unsolved Forecast. Unsolved Forecast assumptions are based on current and historical trends. Changes made to assumptions to achieve fiscal stability are noted throughout the forecast in bold type.

A reduction of over $13.5 million the FY10 operating budget forecast is needed to maintain fiscal stability (Solved Forecast).

3.2 Major Assumptions for Forecasting Future System Operating Costs

3.2.1 Cost Inflation

ECO Northwest projects U.S. and Portland CPI in their short-term forecast, which is used in the finance plan for FY09-FY11. Beyond FY11, a general annual inflation rate of 3.0% is assumed. Portland's inflation rate has been slightly lower than 3% on average for the last twenty years. Higher rates of inflation are applied to energy, contracted service and health benefits costs.

3.2.2 Wages and Salaries

Management wages increase 5% per year throughout the forecast, the past trend. The 5% growth rate includes staff increases as well as wage appreciation.

Union wages are tied to CPI with a floor of 3% and a ceiling of 5%. Due to higher than projected inflation, which was over 4% in FY08, FY09 actual union wages will be an estimated .28 percentage points higher than budgeted. The additional cost of $600,000 has been added to the forecast. Future costs grow from this higher starting point. A 1.75% June 1, 2009 union wage increase is projected. The weighted average union wage increase, then, is a projected 4% in FY09, 3.6% in FY10 and 3% per year thereafter. Each 1% increase = $1.3 million

3.2.3 Health Plans

Presently, TriMet offers two health care plans-Blue Cross Blue Shield (BCBS) PPO and Kaiser for active employees. 65% of union employees and 72% of management employees are in the Blue Cross Blue Shield PPO.

Weighted average rates increased approximately 5% for calendar 2009, lower than projected for the FY09 budget, for a savings of $485,000 from budget. The forecast reflects these savings.

Growth in per employee health and dental plan costs will be an estimated <u>+6.8% in FY10</u> (combines 0% increase second half of calendar 2009 with a projected 17% union and 8% management increase first half of calendar 2010). <u>FY11 and beyond health benefits costs increase 12% per year through FY14 and 10% per year thereafter</u>.

Since 1998, medical and dental costs per employee have increased at an average annual rate of 12.3% per year.

Year	Medical and Dental Costs per Active Employee	Percent Change
1999	$ 4,782	
2000	$ 5,825	21.8%
2001	$ 6,012	3.2%
2002	$ 6,968	15.9%
2003	$ 8,353	19.9%
2004	$ 9,461	13.3%
2005	$11,014	16.4%
2006	$12,060	9.5%
2007	$12,061	0%
2008	$13,630	13.0%

The forecast assumes that TriMet will self-insure for medical costs beginning in FY11. This will save $2.5 million a year (in current dollars) in insurance fees and underwriting costs.

3.2.4 Retiree Medical Plans

TriMet's Retiree Medical costs increased at an average annual rate of 18% per year between FY99 and FY08:

Year	Annual Retiree Medical Costs	Percent Change
1999	$2,505,171	
2000	$2,997,001	19.6%
2001	$3,150.206	5.1%
2002	$4,456,934	41.5%
2003	$4,816,328	8.1%
2004	$6,064,186	25.9%
2005	$7,638,628	26%
2006	$8,847,039	15.8%
2007	$10,294,267	16.4%
2008	$11,782,048	14.5%
2009	$13,660,561	15.9%
2010	$15,897,129	16.0%
2011	$17,750,927	12.0%
2012	$20,960,659	18.0%
2013	$24,637,373	18.0%

Following are forecast assumptions used to project retiree-medical costs:

- The cost of retiree medical plans per retired employee increases 11% per year throughout the forecast, (9% in FY10).

- 14% of qualifying employees age 57 and above retire and receive the retiree-medical benefit; the average retiree adds .5 dependents to the program. The 14% rate is based on the retirement frequency by age used by TriMet's union pension actuary. The death and termination rate is 2% per year.

- As union retirees turn 65, they shift to lower cost Medicare risk plans;

- The overall growth rate that results from these assumptions is 17% per year growth in retiree-medical costs through FY15 and 16.5% per year through FY19. The costs of the program as forecast may be low beyond FY19, as the forecast model does not take into account middle-aged employees who will be hired during the next few years, who become eligible for retiree-medical after ten or more years of employment, then retire.

As required by GASB No. 45, TriMet engaged a firm to conduct an actuarial valuation and review of Other Post Employment (OPEB) Benefits. This valuation determined the Annual

Required Contribution of TriMet's OPEB benefits to be $56.1 million a year. This compares to a current benefits payment of $11 million in FY08. The actuary's projected benefit payments (cash flow) are consistent with the results included in the financial forecast. Forecast assumes retiree-medical costs are paid on a pay-as-you-go basis.

The average age at retirement has been 62.

Since FY01, the average years of service of Transportation retirees who qualify for retiree medical benefits is 24, for Maintenance retirees it is 25, for management retirees it is 23.

Note that retiree-medical costs are shown in the General and Administration line (Line R, Table 1) of the forecast where they are budgeted.

TriMet is one of the few public or private employers in Oregon providing post-employment medical benefits. Employees may retire at age 55 after ten years of service and receive lifetime medical benefits for themselves and their dependents. Like many public agencies and private companies that offer or at one time offered post employment medical benefits, TriMet began this benefit in the 1970s when the work force was young (when promised benefits wouldn't cost anything for many years) and the pension benefit was skimpy. Then in the late 1980s and early 1990s both the management and union pensions were improved, but the post employment medical benefit remained unchanged.

This benefit is unsustainable even on a pay as you go basis, adding an average of $3.5 million a year to costs through FY15 and $6.3 million a year FY16-FY20.

The Solved Forecast assumes 5% overall savings in retiree-medical benefits in FY11, based on plan changes.

3.2.5 Pension Plans

Both union and management pension costs increased above forecast in FY08. FY09 pension valuations (August 2009) will be $4.3 million above budget and subsequent years will be above forecast. Union DB pension costs increased $1.2 million due to demographic changes, new mortality tables, revised assumptions for mini-run operators. Management DB pension costs increased $3.1 million above the FY09 budget. About half of the increase was due to adoption of new mortality tables, half due to more realistic rate of return on pension assets (7%). Changes have been made to the forecast.

The collapse of stock market values is increasing DB pension costs. If the market value of assets in union pension trust are down 20% June 30, 2009, + 8% June 30, 2010 and 8% per year thereafter, union DB pension costs would increase $4.5 million a year, beginning in FY10 and over time increasing to $7.0 million over the previous forecast. This cost has been included in the forecast.

If market value of assets in management pension trust are – 20% June 30, 2009, and 7% per year thereafter, management pension costs would increase $1 million a year over forecast if the unfunded portion is funded over 20 years instead of the current 7.

TriMet leadership will review at the end of the fiscal year to decide the period of funding of the unfunded portion of the union and management pension plans. As of December 3, the S&P 500 is down 33%. The higher pension plan costs have a huge impact all years of the forecast.

3.2.6 Diesel Fuel

Diesel fuel cost per gallon in FY09 of $3.39, including fixed, floating, bio-diesel, bus, LIFT and Commuter Rail. Budget was $4.00 per gallon, growing 7% per year in forecast. Saves $5.0 million from budget in FY09 and $6.4 million in FY10 from previous forecasts. Floating cost average in FY09 = $2.48 and $2.41 in FY10, $2.86 in FY11. Fuel increases 6% per year FY11 and beyond.

The lower fuel cost assumption has a huge impact all years of the forecast.

The forecast assumes that beyond FY10, TriMet will partially offset higher than assumed future diesel fuel costs with fare increases, as it has done five times since 2005.

3.2.7 Natural Gas

Natural Gas costs are projected to increase 50% in FY09 based on NW Natural's estimated cost increases, 15% in FY10 and 7% thereafter.

3.2.8 Electricity

Electricity costs are projected to increase 8% in FY09, 15% in FY10, 8% in FY11 and 7% per year thereafter.

3.2.9 Other materials and services costs increase 2% in FY10 and 3% per year thereafter.

The result of all of the above forecast assumptions is a weighted average personal services and materials and services inflation rate each year. This rate averages 4.8% per year throughout the forecast. By comparison, between FY98 and FY07 system costs per bus vehicle hour increased 4.2% per year and rail system costs per vehicle train hour increased only 0.5% per year.

TriMet's Materials and Services forecast is shown on Table 6, Appendix A. This forecast illustrates the growth in costs for current services.

TriMet's Labor Cost forecast is shown Table 7, Appendix A. This forecast illustrates the growth in costs for current employees.

A reduction of $13.5 million from the FY10 operating budget forecast is needed to maintain fiscal stability. All of the following programs will be affected:

3.3 Bus Operations: Existing Services (Table 1, Line K)

Line K includes costs for Bus Transportation and Bus Maintenance. The FY09 Bus Operations cost estimate is based on TriMet's FY09 Adopted Budget. To project expected Bus Operations costs for FY09, the following steps were taken:

- The FY09 budget was adjusted for one-time-only expenses shown in Table 8, Appendix A.
- Into that result were added increases and reductions in personnel and materials and services costs based on the above - described assumptions.

This process is repeated for each year in the forecast period.

The forecast includes the cost of the unbudgeted November 2008 service increase. Future costs grow from the higher starting point.

TriMet added ten operators to the FY08 budget to cover bus operator shifts that come open when bus operators train to become rail operators. This cost is removed from the forecast in FY10 when Green Line opens for operation.

3.4 Light Rail Operations: Existing Services (Table 1, Line L)

Line L includes costs for Rail Transportation, Equipment Maintenance, Maintenance of Way and Portland Streetcar to Lowell.

The FY09 Rail cost estimate is based on TriMet's FY09 Adopted Budget. To calculate expected Rail Operations costs for FY10, the following steps were taken:

- The FY09 budget was adjusted for one-time-only expenses shown in Table 8, Appendix A.
- Into that result were added increases in personnel and materials and services costs based on the above-described inflation assumptions.

This process is repeated for each year in the forecast period.

The September 2008 rail service improvement to extend the Red Line to Willow Creek cost $.3 million more than budgeted. The additional cost has been added to the forecast. Future costs grow from this higher starting point.

In addition, Green Line startup costs are fully phased in FY09 and subtracted out of this line in FY10. The full operating costs of the Green Line plus July and August startup costs are shown on Line V, Table I beginning in FY10.

FY13, $500,000 of communications fees TriMet pays to the City of Portland each year are removed from the forecast because the new communications system is operating.

Light rail vehicle rehabilitation and overhaul costs are included in this line. TriMet's rail vehicles are maintained in new condition throughout their life with a progressive overhaul program. Unlike most other rail agencies, TriMet's rail vehicles will not be removed from service for an extensive period for overhaul. The overall LRV maintenance program consists of continual program of preventive maintenance, running repairs, component rebuilds, progressive overhaul, modifications (product improvements) and equipment engineering analysis and training. These six program require about 1,000 labor hours per year per vehicle.

Light rail maintenance of way such as rail grinding and surfacing, maintenance and repair or rail operating and customer facilities that is not included in Rail Maintenance operations is included in the Capital Improvement forecast, lines Table 12 Lines 6, 9, 10, 11, 14, 16, 17 and 20.

3.5 Commuter Rail Operations (Table 1, Line M)

Line M accounts for the operations costs of the Commuter Rail line, which will open for service February 2009. Commuter Rail service will be provided during a three-hour morning and a three-hour afternoon commute period each weekday, except for those weekdays designated as a holiday by TriMet. TriMet will provide a regular schedule of no less than 16 two-car trains during the morning commute period and 16 two-car trains during afternoon commute period throughout the planning period.

Responsibility for operations of the Commuter Rail line will be divided as follows between TriMet and the Portland & Western Railroad, a short-line rail operator providing freight service in the Commuter Rail corridor:

- TriMet will maintain vehicles and facilities (i.e. stations, park-and-rides).
- Portland & Western RR will operate Commuter Rail trains, provide dispatch functions and maintain the right-of-way.

A breakdown of Commuter Rail costs is shown in Table 9, Appendix A. Net costs to TriMet after fares, the Washington County and Wilsonville shares are shown in Table 10, Appendix A.

Commuter Rail fuel costs have been reduced from budget consistent with the diesel fuel forecast explained in Section 3.2.7.

Commuter Rail operations forecast includes the cost of heightened maintenance as the system ages. Portland & Western RR provided the cost estimates. They are shown on Table 9, Appendix A, Line 6.

3.6 Streetcar Operations: Existing Services (Table 1, Line N)

The table below illustrates the progression of TriMet's funding commitment for Streetcar operations to Lowell. Eastside Streetcar operating costs (Streetcar Loop) are shown on Table 1, Line Y.

Streetcar Commitment	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010
Base Inflation	1,651,200	1,694,131	1,744,955	1,797,304	1,851,223	1,906,760
Riverplace	120,400	412,801	425,185	437,941	451,079	464,611
Gibbs		137,601	425,185	437,941	451,079	464,611
Lowell				437,941	451,079	464,611
Total Extensions	120,400	550,402	850,370	1,313,822	1,353,236	1,393,834
Grand Total	1,771,600	2,244,533	2,595,325	3,111,126	3,204,459	3,300,593
Additional Annual		472,933	350,792	515,800	93,334	96,134
CPI Adjust	0.032	0.026	0.030	0.030	0.03	0.03

TriMet pays about two-thirds of the cost of Streetcar operations. This ratio is based on the cost to operate Streetcar service with buses. TriMet's cost to extend Streetcar operations to Riverplace, Gibbs and Lowell are made possible by the increase in the payroll tax rate. TriMet's contract with Portland Streetcar ends September 30, 2009. The forecast assumes TriMet's current share continues into the future, increasing only with inflation.

3.7 Field Services: Road and Rail Supervision, Dispatch and Control, Fare Inspection Costs (Table 1, Line O)

Line O includes costs for the Field Services department, which combines bus dispatch, rail control, and bus and rail supervisors. The FY09 Field Services cost estimate is based on TriMet's FY09 Adopted Budget. To calculate expected Field Services costs for FY10, the following steps were taken:

- The FY09 budget was adjusted for one-time-only expenses shown in Table 8, Appendix A

- Into that result were added increases and reductions in personnel and materials and services costs based on the above-described assumptions.

This process is repeated for each year in the forecast period.

January 2009, ten Field Supervisors were added to check fares on the system and enforce the TriMet code. These unbudgeted continuing costs of $885,000 a year costs have been added to the forecast. Future costs grow from the higher starting point.

3.8 Accessible Transportation Program (ATP or "LIFT") (Table 1, Line P)

The ATP line item includes both the transportation and maintenance costs of complementary paratransit services provided for people with disabilities, the Medical Transportation Program (MTP) and the Waivered Non-Medical Transportation Program. The MTP and Waivered program expenses are projected to inflate 3.5% per year, as are program revenues. Since

these expenses are fully reimbursed by the federal Title XIX program and the State of Oregon, growth rates do not affect TriMet's financial condition.

The ADA complementary paratransit (LIFT) forecast includes the cost of current service levels and the cost of estimated service growth. LIFT provides door-to-door transportation for individuals who are unable to access fixed route services due to a disability.

The LIFT forecast begins with the costs shown in the FY09 Adopted Budget, adjusted for lower diesel fuel costs. As of September 30, 2008 LIFT is projected to be $1 million under budget (not including diesel fuel costs) due to lower than expected ridership growth. Future years costs grow from this lower base.

FY10 and beyond, costs are the product of the rate of growth of such services and the inflation rate applicable to the costs of such services.

Ridership growth on LIFT is slowing. Since FY99, LIFT ridership has increased 6.0% annually with the last three years averaging 3.9% and the last eighteen months averaging 2.6%.

Since 2005, growth in LIFT costs above inflation has been supported with revenues from the increase in the payroll tax rate.

A paratransit ride costs ten or eleven times that of fixed route. On fixed route, additional trips can be added at no cost until the capacity of the vehicle is reached, while on paratransit, LIFT ridership growth results in a commensurate increase in LIFT service growth and vehicle purchases. Between FY99 and FY2008 in CPI adjusted dollars the additional cost per LIFT ride added, including the additional cost of operations, vehicles and facilities was $57 per one-way trip!

Like many transit agencies throughout the country, TriMet has taken steps to reduce the growth of ADA paratransit costs by providing travel training for elders and people with disabilities, by improving fixed route service with more accessible stops and bus shelters, additional security, training drivers to provide elder friendly customer service and by providing community based shuttles and door to door service through the private non-profit Ride Connection network.

The tri-county area is just a few years away from the beginning of a dramatic demographic shift, one that has significant implications for LIFT costs and services. Today, one in ten people are over age 60. Between 2005 and 2030, the growth of people age 60 and older will be 151%, while the growth of the general population will be just 37%. By comparison, between 1990 and 2000, the elderly population grew just .5% a year.

Furthermore, the incidence of disability increases with age. Today, 16% of the regional population has a disability, but 39% of the age 65+ population has a disability, according to 2000 census data.

LIFT Growth Projections. A just published TRB study of 28 transit systems "Improving ADA Complementary Paratransit Demand Estimation" found the factors that significantly affect demand for ADA complementary paratransit are:

1. Demand is highly sensitive to fares

2. Systems that have higher percentages of applicants found conditionally eligible have lower demand

3. Systems that conduct trip-by-trip determination based on conditions of eligibility have much lower demand

4. Demand is highly sensitive to standards for on-time pickups. Systems that define on-time for pickups using a wider window have lower demand.

5. Demand is correlated with total population growth

Beginning in FY10, TriMet plans to change its process for LIFT eligibility from using a paper form and a phone call to 50% of applicants to conducting an in-person assessment. As required by the ADA, emphasis will be placed on determining when and under what conditions individuals with disabilities can and cannot use fixed route. TriMet LIFT will recertify current LIFT clients over a three-year period as well as conduct in-person assessments of new applicants.

A new LIFT forecast has been developed taking into account the changes in ridership growth that can be expected according to the TRB study. The full forecast is included on Table 11.

The forecast includes the annual costs of the in-person assessments, the projected savings from the three-year recertification (which accumulate over three years, then decline as the client base turns over. LIFT has a 30% annual turnover rate), and lower future growth in LIFT ridership. Future LIFT growth is based on the state's population forecast by age for the tri-county area. About 30% of LIFT trips are made by individuals who are over age 70. Their ridership is assumed to grow with the growth in elderly population as forecast by the state of Oregon. About 70% of LIFT trips are made by riders who are under age 70. Their ridership is assumed to grow with the growth in total population as forecast by the state of Oregon.

The population forecast by age from the state of Oregon is summarized here for the tri-county area.

Average Annual Change for TriMet Area					
	2005-2010	2010-2015	2015-2020	2020-2025	2025-2030
Total Population	1.2%	1.0%	0.8%	1.0%	1.0%
70-85% Population	0.6%	3.1%	5.7%	5.3%	3.8%

The resulting LIFT ridership growth forecast is illustrated here:

	FORECAST SCENARIO Grows w/Pop	Grows w/Elderly Pop		
	70%	30%	Total	
1,122,000	785,400	336,600	1,122,000	
2009	811,318	338,552	1,149,870	2.5%
2010	823,488	340,245	1,163,733	1.2%
2011	827,605	341,946	1,169,552	0.5%
2012	827,605	343,656	1,171,261	0.6%
2013	831,743	345,374	1,177,118	0.5%
2014	835,902	347,101	1,183,003	0.5%
2015	844,261	358,000	1,202,261	1.6%
2016	851,015	378,406	1,229,421	2.3%
2017	857,823	399,975	1,257,799	2.3%
2018	864,686	422,774	1,287,460	2.4%
2019	871,603	446,872	1,318,475	2.4%
2020	880,319	470,556	1,350,876	2.5%
2021	889,123	495,496	1,384,618	2.5%
2022	898,014	521,757	1,419,771	2.5%
2023	906,994	549,410	1,456,404	2.6%
2024	916,064	578,529	1,494,593	2.6%
2025	925,225	600,744	1,525,969	2.1%
2026	934,477	623,813	1,558,290	2.1%
2027	943,822	647,767	1,591,589	2.1%
2028	953,260	672,642	1,625,901	2.2%
2029	962,792	698,471	1,661,263	2.2%
2030	972,420	725,292	1,697,713	2.2%

The new forecast results in significant savings over previous forecasts in operating costs and vehicles.

Additionally, a recent analysis by TriMet’s Internal Audit department of LIFT provider insurance costs demonstrates that $1 million per year could be saved if TriMet self-insured LIFT operations. The forecast assumes that TriMet self-insures for LIFT operations, saving $1 million a year continuing expenditures beginning in FY10.

3.9 Capital Projects and Facilities Maintenance (Table 1, Line Q)

Line Q includes costs for Capital Projects and Facilities Maintenance. The FY09 cost estimate is based on TriMet's FY09 Adopted Budget. To calculate expected Capital Projects and Facilities Maintenance costs for FY10, the following steps were taken:

- The FY09 budget was adjusted for one-time-only expenses shown in Table 8, Appendix A
- Into that result were added increases and reductions in personnel and materials and services costs based on the above-described assumptions.

In addition, the following adjustments are made to line Q:

The Capital Projects department has 17 full-time employees (non-grant funded). The Capital Projects department is responsible for all capital project management, except for light rail/commuter rail projects. This staffing level is adequate for the forecast capital plan. Additional costs for shelter and customer amenities maintenance are added each year commensurate with planned bus shelter installations in the Capital Plan. Additional annual shelter maintenance costs added to the forecast are shown on the Statistics page, Table 1, Line 38.

Milwaukie Light Rail will displace the Holgate administration facility, which is leased. At this time, the forecast assumes that another facility will be leased at no additional cost to house the displaced Holgate employees.

One limited term Engineer IV position is added to the forecast FY10-FY14 to implement light rail crossing safety improvements.

3.10 General Administration and Security (Table 1, Line R)

Line R includes costs for the Office of the General Manager, Finance and Administration, Human Resources/Legal Services, Marketing and Customer Service, Operations Administration, Transportation Planning, Transportation Services, and Operations Support, which includes Safety and Security. The FY09 cost estimate is based on TriMet's FY09 Adopted Budget. To calculate expected General Administration costs for FY10, the following steps were taken:

- The FY09 budget was adjusted for one-time-only expenses shown in Table 8, Appendix A.
- Into that result were added increases/reductions in personnel and materials and services costs based on the above-described assumptions.

This process is repeated for each year in the forecast period.

Following an incident at a light rail station this year, TriMet committed to increase its police force from 36 to 53 officers (budgeted in FY09). Recently, the commitment has increased to 58 officers; the additional five are unbudgeted but have been added to the forecast. To offset the five unbudgeted police officers, the increase in contracted security has been reduced in the forecast by the cost of the additional police.

The total additional cost of the safety and security improvements is $3.12 million. When the additional field supervision is included the cost of the improvements is $4 million.

Additionally, the FY09 budget provides for closed circuit TV security improvements, funded with Department of Homeland Security grants, and funds to develop a prototype improvement to the existing lighting systems at two eastside MAX stations.

3.11 Capital and Operating Projects (Table 1, Line S)

Line S includes General Fund monies that are transferred to the Capital Fund shown in Table I of Appendix A. The Capital Fund addresses expenditures for TriMet's Capital Replacement and Improvement Program, which generally consists of:

- Committed improvements.
- An on-going vehicle replacement program that replaces fixed route buses and paratransit vehicles and light rail vehicles that have exceeded their economic lives with new vehicles.
- An on-going program of fixed route bus, ATP and LRT equipment and facilities and information technology improvements and replacements.
- The acquisition of additional (non-replacement) fixed route buses, paratransit vehicles, and light rail vehicles to meet the needs of forecast service and ridership increases.

A schedule of specific improvements and vehicle and equipment replacements is included in Table 12. The costs of capital improvements and vehicle replacements are estimated to inflate 3% per year throughout the planning period. The following summarizes key elements of the program.

Forecast assumes most Capital Improvement Plan expenditures as submitted by staff Spring 2008. **The Solved Forecast assumes $4.5 million in Capital Program reductions in FY10 and $5 million in FY11. More may be needed to achieve fiscal stability.**

A. Replacement Program (Unsolved Assumptions):

- <u>Buses replaced</u> 40 per year 2009 through 2030. Twelve-year bonds issued to pay for buses. **Solved Forecast: the FY10 bus order and all subsequent bus orders are delayed one year.**

- ATP vehicles replaced at ten years of age

- IT expenditures through 2012 as planned in the Capital Improvement Program in 2007, FY13 and beyond, the forecast assumes a $3.0 million annual IT replacement requirement growing 3% per year.

- Non-revenue vehicle replacements to restore the fleet over five years after no replacements during the recession, as proposed by Operations

- BDS and Radio Replacement as planned. YOE cost: $41 million. Twelve-year bonds issued to pay for project.

- Begin Fare System Replacement FY12. Project cost in YOE$ is $42 million. Project completed FY2015 (preliminary). Twelve year bonds issued for project.

- Maintenance of Way (MOW) capital maintenance requirements (rail grinding, ties, ballast, signal materials) for Commuter Rail is included in the annual operating costs of the project. Portland & Western Railroad, the freight operator, has estimated these costs. An additional $1.5 million (in today's dollars) is assumed in MOW capital maintenance when the Green Line begins its 8th year of operation.

- The cost to replace 26 Type I LRVs in FY22 at 36 years of age is included in FY22

B. Additions (Unsolved Assumptions):

- $2.3 million in forecast in FY09 for Millikan park and ride.

- Five buses are added to the fleet every two years beginning FY11 for proposed service changes and each year thereafter to maintain schedules and add peak capacity

- LIFT fleet additions per year as discussed above.

- Willow Creek Turnaround, needed to extend Red Line service to 185th, $2.5 million in FY10, debt is issued for the project.

- The forecast assumes no TriMet funding of CRC cost overruns or CRC capital match.

- Two light rail vehicles scoped out of the Green Line project due to cost pressures, are included in the forecast in FY14. Twenty-five year bonds issued to pay for project.

- $200,000 a year is added in FY10 and subsequent years, growing with inflation, for the replacement of the original fixed route bus CCTVs.

- $200,000 each year FY10 through FY14 to implement study recommendations for rail crossing safety.

- The cost of 10 additional light rail vehicles forecast to be needed for 2030 rail ridership growth trends is included in the forecast in FY21 and 10 are added in FY27.

- An annual allocation for additional bus maintenance facilities improvements is included each year beginning in FY15.

- The cost of a light rail maintenance facility expansion, identified in the I-205/Mall LRT Project, is included in FY18.

- In FY08 and FY09 TriMet pays for Washington County Commuter Rail cost increases $40.8 million. Revenue offsets are: a stream of MTIP revenues FY11-FY25 for bus replacement debt service and Washington County's $13.75 million repaid with interest over FY09-FY12.

- Steel Bridge repairs completed, with TriMet General Fund contributing a total of $2.0 million, most in FY09.

- Green Line related expenses in General Fund Capital = $2.7 M ($1.5M for LRV spare parts, plus other costs for ice caps, non-revenue vehicles, ice caps).

- TriMet's share of Milwaukie LRT construction costs is assumed to be $30M. Another $10.8 million (in today's dollars) is assumed in TriMet costs related to Center Street improvements. Twenty-five year bonds are issued FY12 to fund these two projects.
- In FY09 TriMet contributes $1.822 million for Milwaukie LRT Project FEIS plus $507,000 for an unbudgeted geo-technical underwater study. $1.5 million of this $2.3 million cost is offset by a funding exchange with Metro whereby TriMet receives $1.5 million CMAQ funds for LIFT vehicles in exchange for a TriMet general fund commitment to Milwaukie pre-PE expenses.

- The forecast assumes TriMet receives permission to enter Milwaukie PE March 2009 instead of January 2009 as budgeted. The additional cost of $767,000 to carry Project staff through March is **not** added to the forecast.

- Merlo operating base improvements scheduled for FY09-FY11. These are the fuel wash facility improvements, and the LIFT operations building. Improvements total $10.5 million in YOE$. TriMet issues 20-year bonds to finance the project. Moved to FY12-FY14 in the forecast.

Over the past few years, TriMet created significant savings in its capital investments through productivity improvements. The reduction of the bus spare ratio and peak fleet from 20% to 15% has saved $9 million. Peak bus requirements have been reduced by 27 vehicles since September 2000, saving an additional $8.2 million in bus capital costs. Reducing spares, reducing peak vehicles, and slower growth deferred the need for bus garage expansion by 15 years.

TriMet produced additional savings by cost-effectively extending the useful life of equipment and vehicles. ATP vehicles are now retired when they have 330,000-350,000 miles (10 years). TriMet buses are now retired at 15 years or older. It is important to note that in both of these cases road-call performance has improved, in spite of the higher retirement age and mileage.

Fixed route bus miles between road-call increased from 7,513 in FY03 to 16,679 through May 2008, a 122% improvement. Paratransit miles between road-call increased 42% from 49,205 in FY03 to 69,783 through May 2008. Key to this improvement has been strict adherence to preventive maintenance schedules.

In addition, TriMet has continued to maintain its facilities, funding replacement of underground storage tanks and storm water treatment upgrades, painting facilities and facilities equipment and roof replacements on schedule.

3.12 **Debt Service** (Table 1, Line T)

This line item addresses debt service on General Fund-supported revenue bonds and capital leases. On new debt, issuance costs, insurance and fees adds 5% to the cost. The interest rate assumed on mid-term (fifteen-year) debt is 4.5%. The interest rate assumed on long-term (twenty-five year) debt is 5.5%. Currently, TriMet has the following revenue bonds, either outstanding or planned: Table 13 includes Debt Service detail FY05 – FY30.

- $32.2 million for Eastside MAX local match requiring $2.6 million annual payments. Last year of payments is 2012. Table 13, Line 1

- $27.4 million for the Eastside MAX retrofit requiring $1.9 million annual payments. Last year of payments is FY17. Table 13, Line 2

- $37.5 million for the Airport Light Rail project and $45 million for the Interstate MAX project. Interstate MAX is composed of $38.5 million of short and long-term debt for Interstate MAX, $2.5 million of long-term debt for rail retrofits with the balance for reserves ($4 million). Last year of payments is FY21. Table 13, Line 5

- $68.5 million of mid-term debt to complete Washington County Commuter Rail ($10 million), I-205/Mall LRT Project ($58.5 million). This cost of debt service is offset by a like amount of STP or CMAQ revenues made available by Metro Council Resolution. An additional $13.255 million of mid-term debt, paid for with General Fund revenues, for the FY06 bus order and other capital, was issued at the same time. Table 13, Line 7

- $45.333 million 25-year revenue bonds issued to pay for TriMet's share of the I-205/Portland Mall LRT project, North Macadam and Commuter Rail. The $45.333 million of debt was issued January 2007. Table 13, Line 8.

- $49.550 million 20-year debt to pay for Commuter Rail cost overruns and FY09 and FY10 buses. Table 13, Line 9.

- 7-year debt issued for buses, the communications and fare system replacement projects. Table 13, Lines 10, 11, 13, 15,17, 19, 20, 21, 22, 24, 25, 26, 28, 30, 31, 32, 34, 35.

- 25-year debt issued FY12 to pay for TriMet's $30 million share of the Milwaukie light rail project, plus $10 million debt to pay for non-FFGA Milwaukie related improvements. Table 13, Lines 14.

- 30-year debt issued for Merlo property projects, Millikan Park and Ride, Willow Creek rail improvements Table 13, Line 16.

- $18.7 million long-term debt to expand the Ruby Junction light rail maintenance facility (issued FY18). Table 13, Line 23.

- Long-term debt to purchase 19 additional LRVs needed for system ridership growth (issued FY19). Table 13, Line 27, Line 33.

- Long-term debt to replace 26 Type I LRVs. (Issued FY22). Table 13, Line 29.

- **MBIA Lease Payments included in Solved Forecast**

The <u>next sections</u> address changes to operating expenses associated with new bus and rail services during the forecast period. Expenses associated with services that existed at the outset of the planning period are accounted in Lines K-T above. The major expenses from future service are shown in Lines U through Z described below:

3.13 Bus Operations: Future Expansion (Table 1, Line U)

FY10 and each year thereafter, bus service increases 0.5% per year throughout the forecast. Additional buses are purchased, an average of 5 every 2 years beginning in FY12. **Solved forecast: No additional bus service until at least FY12.**

Between FY90 and FY06 bus service levels increased an average of 2.0% per year. FY01 through FY06, TriMet reallocated 4,200 weekly hours of low performing service to high performing lines—to create frequent service routes, add peak hour service and improve schedule reliability. In the final year of adjustments, FY06, TriMet reduced both bus (-4%) and rail service (-2.7%). These service reductions were "surgical" and reduced unproductive trips within routes. The result was minor service adjustments on over three dozen bus lines, focusing on low ridership trips and on adjusting schedules on lines with available seating capacity. TriMet minimized impacts on riders by making minimal changes to span of service, adjusting schedules by 3 to 5 minutes; keeping Frequent Service intact; and measuring lift deployments and use of lines by low income/minority riders to determine that there is not a disproportionate impact on those riders.

In FY07, TriMet added service to four inner-city bus lines. In FY08 TriMet extended Line 155 and added trips to accommodate ridership demand on several bus lines. In FY09 TriMet is adding service on six bus lines.

In FY09, new bus service costs $74.92 per vehicle hour. The sizeable increase in cost over FY08 is due to the increase in diesel fuel costs and the addition of retiree-medical normal cost. Costs include the normal cost per employee of union DB pension plan benefits. Retiree-medical costs are pay-as-you-go. These are the marginal costs of adding service. This cost is projected to inflate as described above. The cost shown in each fiscal year in line U is the cumulative additional cost since FY09.

Line 32, Table 1, Statistics page shows the total annual bus vehicle hours assumed in the forecast.

3.14 Rail Operations: East/West, Airport MAX and Interstate MAX (Table 1, Line V)

Line V includes costs for expanded service hours and service miles on the East/West MAX, Airport MAX, and Interstate MAX.

The FY09 marginal cost of rail service additions is $48.00 per vehicle hour and $2.09 per car mile. These costs include the additional normal cost per employee of union DB pension plan benefits, but not retiree-medical normal costs, which are funded "pay-as-you-go." The costs inflate as described above.

- MAX service adjustments to extend the Red Line to Willow Creek begin September 2010 (FY11), with turn around built in FY10 after Green Line opens.

- Second cars added annually to Yellow Line trains beginning in FY09.

- Blue Line service increases to meet peak demand beginning FY09 and every year thereafter

Solved Forecast assumes delays in the above service expansion to FY12. In addition current rail service will likely need to be reduced.

The cost shown in each fiscal year in Line V is the cumulative additional cost since FY09.

Forecast service increases are based on observations of historic growth in MAX ridership trends forecast to future years.

Additional rail service on the Green, Red and Yellow lines is made possible by the increase in the payroll tax rate.

Line 33, Table 1, Statistics page shows the total annual rail vehicle hours assumed in the forecast.

3.15 Rail Operations: I-205/Portland Mall LRT (Green Line) Operations (Table 1, Line W)

I-205/Portland Mall LRT service begins September 2009. Line V contains costs to operate I205/Mall LRT Project beginning in FY10. The costs of operating I-205/Portland Mall LRT Project are based on TriMet's cost experience for the East/West, Airport and Interstate MAX operations. LRT operating costs vary based on the vehicle hours and miles of service, and the number of LRVs, employees, route miles, and stations. Vehicle miles and hours were based on ridership data provided by Metro. The operating cost estimates for I-205/Portland Mall LRT Project presented in the forecast have been developed by the Operations division and now constitute a plan that TriMet has been hiring against since 2007.

A build-up of I-205/Portland Mall LRT Project operations costs for FY10 and FY30 is in Tables 14A and 14B. Costs are based on the FY09 budget and increased according to the weighted average increase for new services.

To operate I-205/Portland Mall LRT Project, the following positions were added:

- Operators
- Controllers
- Supervisors
- LRV Mechanics
- LRV Cleaners
- MOW Cleaners, Laborers, Landscapers
- MOW Technicians, Maintainers
- Fare Inspectors
- Police and Other Security Services
- Rail Transportation Training Supervisor

Costs include the additional normal cost per employee union DB pension plan benefits. Retiree-medical benefits are assumed in the forecast as "pay-as-you-go." In addition, an allowance per employee was made for overtime, shift differential, and longevity premiums

The following materials and services were added:

- Propulsion (costs based on projected car miles, kilowatt hours per car mile and costs per kilowatt hour)
- Repair and maintenance materials for LRVs and Maintenance of Way

For opening year, one maintenance bay will be added to the Ruby Junction facility for I205/Mall LRT Project LRV maintenance. In addition, Elmonica will have a new building.

Existing Maintenance of Way staff will be moved to the new building to make room for additional I-205/Portland Mall LRT Project car maintenance and cleaning.

TriMet's rail vehicles are maintained in new condition throughout their life with a progressive overhaul program. The overall LRV maintenance program consists of continual program of preventive maintenance, running repairs, component rebuilds, progressive overhaul, modifications (product improvements) and equipment engineering analysis and training. These six programs require about 1,000 labor hours per year per vehicle.

Other costs that increase as the system ages, such as rail grinding and surfacing, maintenance and repair or rail operating and customer facilities that is not included in Rail Maintenance operations is included in the Capital Improvement forecast, lines Table 8 Line 10; beginning in the eighth year of operation $1.5 million a year in 2008 dollars is added to the finance plan

Green Line operations are made possible by the increase in the payroll tax rate and additional fares from Green Line passengers as shown in Table 2, Appendix A.

3.16 Portland-Milwaukie Light Rail (Table 1, Line X)

Portland-Milwaukie Light Rail service begins September 2015. Line X contains the cost to operate the Portland to Milwaukie extension. Milwaukie Light Rail service hours are derived from Metro model peak load ridership for the opening target years and TriMet policy headways.

Costs are developed based on TriMet's current cost of light rail operations per unit of service, vehicle hours, peak vehicles, car miles, and route miles and have been reviewed by Operations staff.

Milwaukie light rail operations are made possible by the increase in the payroll tax rate and additional fares from Milwaukie LRT passengers as shown on Table 2, Appendix A.

FY2016 Portland-Milwaukie Light Rail annual budget in 2009$ is shown on Table 15A, Appendix B. FY2030 Portland-Milwaukie Light Rail budget in 2009$ is shown on Table 15B, Appendix A. TriMet begins to operate 2030 service levels in 2025. Costs are increased according to the weighted average increase for new service.

TriMet's rail vehicles are maintained in new condition throughout their life with a progressive overhaul program. These costs are included in the operating costs shown in Line X. Unlike most other rail agencies, TriMet's rail vehicles will not be removed from service for an extensive period for overhaul. The overall LRV maintenance program consists of continual program of preventive maintenance, running repairs, component rebuilds, progressive overhaul, modifications (product improvements) and equipment engineering analysis and training. These six programs require about 1,000 labor hours per year per vehicle.

Other costs that increase as the system ages, such as rail grinding and surfacing, maintenance and repair or rail operating and customer facilities that is not included in Rail Maintenance operations is included in the Capital Improvement forecast, lines Table 8 Line 10; beginning in the eighth year of operation (FY23) $1.5 million a year in 2008 dollars is added to the finance plan.

3.17 Streetcar Eastside (Table 1, Line Y)

Eastside Streetcar service begins operations in FY12. TriMet provides partial financial support for its operation with New Payroll Tax revenues of $1.288 million annually, made possible by the increase in the payroll tax rate. The basis for the TriMet General Fund contribution is the cost of equivalent bus Frequent Service. The table below illustrates the Streetcar Loop revenues and expenditures.

Proposed Source of Operating Funds

Expenditures		*2011 $*
Operating Cost	$	4,211,491
Operating Cost Savings*	$	(510,932)
Total Operating Cost	$	3,700,559
Revenues		
Streetcar Farebox Revenues	$	1,063,606
Streetcar Sponsorships		180,250
City Parking Tax Revenues		1,228,351
TriMet General Fund Contribution		1,228,351
Total		3,700,559

*Operating Cost Savings represent expected savings from a combination of 1) increased travel times, 2) bus service reallocation and or 3) reducing the number of management overhead positions assumed in costs

3.18 Columbia River Crossing (CRC) (Table 1, Line Z)

It is assumed that CRC LRT service begins in September 2015. These costs reflect TriMet's current cost of light rail operations per unit of service, peak vehicles, car miles and route miles. The operating assumptions and costs have been reviewed by Operations staff.

Costs were developed based on TriMet's current cost of light rail operations with a few adjustments to account for the higher relative number of park and ride facilities associated with the CRC LRT project.

TriMet and C-TRAN will participate in funding the cost of operations. TriMet's share, shown on Table 1, Line Z is based on the proportion of costs south of the Oregon-Washington state line.

TriMet's rail vehicles are maintained in new condition throughout their life with a progressive overhaul program. These costs are included in the operating costs shown in Line X. Other costs that increase as the system ages, such as rail grinding and surfacing, maintenance and repair or rail operating and customer facilities that is not included in Rail Maintenance operations is included in the Capital Improvement forecast, lines Table 8 Line 10; beginning in the eighth year of operation (FY23) $0.5 million a year in 2008 dollars is added to the finance plan.

The FY2016 CRC annual budget in 2009$ is shown on Table 16A, Appendix A. The FY2030 CRC Light Rail budget in 2009$ is shown on Table 16B, Appendix A**.**

New revenues beyond the current .7218 payroll tax rate will be required to support CRC operations.

4.0 System Cash Flow Analysis

4.1 Overview

The total of all the assumptions enumerated above represents TriMet's agency-wide operating plan. The detailed result showing all TriMet system-wide operating and maintenance costs and revenues in year of expenditure dollars through FY30 are provided in Table 1. Each of these lines is explained below.

4.2 Total Continuing Expenditure, Less Capital (Table 1, Line AA)

Line W sums Lines K through X, except for the Transfer to Capital Fund shown in Line Q. Based on the assumptions enumerated above, operating costs (excluding capital costs) are forecasted to increase on average by 6.4% annually FY089-FY30 in the Unsolved Forecast.

4.3 Total Continuing Expenditures (Table 1, Line AB)

Line AB sums Lines K through Z, including Line S.

4.4 General Fund Results (Table 1, Line AC)

Line AC is calculated by taking total Continuing Revenues (Line J) and subtracting total Continuing Expenditures (Line AB). A negative number means that expenses exceeded revenues for that year.

4.5 Beginning Working Capital (Table 1, Line AD)

This line item reflects current assets minus current liabilities as of July 1 of the subject fiscal year of the forecast period. Current assets are defined as cash and other liquid assets that can become cash during the next twelve months. Current liabilities are obligations due within the next twelve months.

TriMet's auditing firm, KPMG changed how payroll taxes and self-employment taxes are recognized on the balance sheet in current assets to record revenue and a receivable equivalent to one-quarter's payroll tax revenue. The newly recognized receivable increased working capital $46 million. This is reflected in the forecast beginning in FY06. Financial Statements and Supplementary Information June 30, 2008 and 2007, records TriMet Working Capital as of June 30, 2008 of $257 million with an operating ratio of 2.2. However, the Balance Sheet includes assets and liabilities that are restricted to the Commuter Rail and I-205/Portland Mall Light Rail Project.

Fully adjusting TriMet Beginning Working Capital for project revenues and expenditures funds results in TriMet General Fund Beginning Adjusted Working Capital that is shown on Line AD, Table 1. The adjusted Working Capital calculation, shown in Appendix A, Table 17, is $43.807 million, 1.3 months of operating expense.

FY09-FY30, the sum of the Beginning Working Capital in a subject year and the current General Fund Result (revenues minus expenditures) of the same year establishes Beginning Working Capital for the subsequent year. Audited results are shown in past years.

4.6 Working Capital Percent of Operating Expense (Table 1, Line AE)

Expressed as a Percent of Operating Expense, TriMet began FY09 with Working Capital of 1.3 months of operating expense.. Analysis shows that TriMet requires working capital equivalent to a minimum of 1.8 months of operating expense. Negative General Fund results cause working capital to dip well below 1.8 months by the beginning of FY10 requiring cost reductions to bring revenues and expenditures in balance.

4.7 Cash, Cash Equivalents and Investments (Table 1, Line AF)

Cash and short-term investments (12 months or less) at the beginning of the subject fiscal year. Project or other restricted revenues are not included in the beginning cash amount shown in the forecast. The sum of Cash and Cash Equivalents in a subject year and the current General Fund Result of the same year equal Cash and Cash Equivalents for the subsequent year. TriMet needs enough cash on hand to pay expenses in peak months without borrowing and provide a short-term contingency for revenue and expenditure exposure.

For TriMet, this is typically September, when the annual defined benefit pension expenditure and some debt service payments are made and April and May before federal formula funds are received. TriMet also prepares a cash forecast to analyze whether cash reserves are adequate for projected monthly expenditures beyond the fiscal year

As of June 30, 2008, TriMet had cash and cash equivalents of $227.69 million. Adjusting for Commuter Rail and I-205/Portland Mall Light Rail, leaves $105 million in General Fund cash and cash equivalents. October 31, 2008 General Fund cash was about $25 million.

4.8 Cash as a Percent of Operating Cost (Table 1, Line AG)

Cash and Cash Equivalents divided by Total Continuing Expenditures (Line AB). TriMet begins the forecast with cash and cash equivalents of 25% of operating and capital expense. Analysis shows that TriMet requires cash and cash equivalents equal to 25% of total expense to maintain fiscal stability. . Negative General Fund results cause cash to dip well below 25% by the beginning of FY10 requiring cost reductions to bring revenues and expenditures in balance.

5.0 Solved Forecast

In summary, the minimum short-term actions needed to address TriMet's revenue and expenditure imbalance are:

1. $13.5 million in continuing cost reductions from forecast, beginning in FY10, as much as possible without layoffs. Expected savings after accounting for passenger revenue losses are $11.5 million.
2. Additional (standby) service cuts to be identified in case budgeted reductions are not or cannot be made or revenues are lower than forecast.
3. No bus or rail service increases in FY10 and FY11 beyond Green Line. This means postponing Willow Creek improvements.
4. $5 million in capital program reductions in FY10 and $4.5 million in FY11.
5. No FY10 bus replacement, and move all scheduled replacements out one year. This reduction is the first that will be restored if new revenues materialize or TriMet's operating margins improve.
6. $1 million savings in LIFT from self-insurance
7. Assume LIFT savings in FY09 of $1 million, with future years growing from this lower base.
8. LIFT in-person assessments with LIFT conditional eligibility emphasis (assumed in forecast)
9. At the end of FY09, TriMet leadership will review the length of funding for the management and union DB pension unfunded liability to decide the period of funding

Additional action is needed to improve cash reserves and finance capital infrastructure.

Appendix A

Table 1. FY09 Unsolved Forecast

General Fund (YOE, 000s)

(000s)	FY2008 FORECAST	FY2009 FORECAST	FY2010 FORECAST	FY2011 FORECAST	FY2012 FORECAST	FY2013 FORECAST	FY2014 FORECAST	FY2015 FORECAST	FY2016 FORECAST	FY2017 FORECAST
Revenues:										
A. Passenger Revenue	80,821	93,532	104,399	111,657	117,810	124,645	131,904	139,594	154,544	168,372
B. Other Operating Revenue	30,254	29,250	31,582	32,713	32,910	33,108	34,243	35,418	36,636	37,896
C. Employer/Municipal Payroll Tax	189,615	193,407	198,822	205,185	219,548	240,405	255,310	271,139	287,950	305,802
D. Self Employed Tax	11,200	10,976	11,163	11,531	12,131	12,761	13,425	14,123	14,857	15,630
E. State In-Lieu	2,215	2,231	2,351	2,459	2,582	2,711	2,847	2,989	3,138	3,295
F. Grants & Capital Reimbursement	61,633	57,929	58,828	58,889	64,152	66,829	68,547	70,322	72,156	74,576
G. Interest	6,463	3,326	2,990	2,525	1,887	0	1,023	746	466	0
H. ATP-Cigarette Tax, Agency	3,223	3,200	3,291	3,386	3,486	3,593	3,704	3,822	3,947	4,077
I. New Revenues	10,505	13,982	17,746	21,802	27,012	33,596	39,991	45,899	48,730	51,735
J. Total Continuing Revenues (CR)	395,929	407,834	431,172	450,147	481,518	517,648	550,994	584,053	622,423	661,385
	10.4%	3.0%	5.7%	4.4%	7.0%	7.5%	6.4%	6.0%	6.6%	6.3%
Expenditures, Current Service:										
K. Bus Operations	163,412	174,786	182,042	187,864	196,861	207,103	217,439	226,854	236,871	247,536
L. Light Rail Operations	43,655	47,522	46,438	48,190	50,634	52,994	55,804	58,373	61,108	64,022
M. Commuter Rail Operations	250	2,436	5,216	5,328	5,536	6,526	6,197	6,324	6,518	6,775
N. Streetcar to Lowell	6,192	6,246	6,527	6,821	7,128	7,448	7,784	8,134	8,500	8,882
O. Field Operations	10,607	13,194	14,290	14,708	15,379	16,156	16,933	17,617	18,347	19,127
P. Accessible Transportation Programs	44,874	47,764	49,842	50,927	52,173	53,866	57,021	61,258	65,966	70,346
Q. Capital Projects & Facilities	20,459	19,245	20,274	21,313	22,366	23,531	24,722	25,671	26,878	28,158
R. General & Administration/Security	61,247	67,591	73,256	76,786	82,460	88,890	95,858	103,117	111,072	119,723
S. Capital and Operating Projects	17,233	20,732	11,334	9,978	6,474	10,376	10,597	12,303	13,920	15,978
T. Debt Service	20,653	24,303	29,827	32,204	40,710	41,596	45,584	49,127	51,118	53,365
Expenditures, Future Service										
U. Bus Operations: Peak, Reliability, New			764	1,599	2,509	3,476	4,556	5,722	6,990	8,371
V. Rail Operations: East/West, Airport, IMAX			450	1,673	2,085	2,518	3,014	3,552	4,142	4,730
W. Rail Operations: I-205 LRT			9,360	10,479	10,937	11,333	11,853	12,375	12,926	13,510
X. Rail Operations: Portland-Milwaukie LRT								-	10,162	10,613
Y. Rail Operations: Portland Eastside Streetcar Contribution					819	1,283	1,341	1,401	1,464	1,530
Z. Rail Operations: Columbia River Crossing									5,551	5,803
AA. Continuing Expenditures Less Capital	371,350	403,088	438,286	457,892	489,597	516,721	548,107	579,527	622,062	656,689
AB. Total Continuing Expenditures (CE)	388,583	423,820	449,620	467,870	496,071	527,097	558,704	591,829	635,982	672,668
AC. General Fund Results	7,346	(15,986)	(18,448)	(17,723)	(14,553)	(9,449)	(7,710)	(7,776)	(13,559)	(11,283)
	12.7%	9.1%	6.1%	4.1%	6.0%	6.3%	6.0%	5.9%	7.5%	5.8%
AD. Beginning Working Capital	36,477	43,808	27,822	9,374	(8,349)	(22,903)	(32,351)	(40,061)	(47,837)	(61,396)
AE. Working Capital in Months of Operating Expense	1.18	1.30	0.76	0.25	(0.20)	(0.53)	(0.71)	(0.83)	(0.92)	(1.12)
AF. Cash and Cash Equivalents *	89,855	104,581	88,595	70,147	52,424	37,871	28,422	20,712	12,936	(623)
AG. Cash as a Percent of Operating Cost	23%	25%	20%	15%	11%	7%	5%	3%	2%	0%

Table 1. FY09 Unsolved Forecast

General Fund (YOE, 000s)

	(000s)	FY2018 FORECAST	FY2019 FORECAST	FY2020 FORECAST	FY2021 FORECAST	FY2022 FORECAST	FY2023 FORECAST	FY2024 FORECAST	FY2025 FORECAST	FY2026 FORECAST	FY2027 FORECAST
	Revenues:										
A.	Passenger Revenue	178,155	188,510	199,473	211,076	223,358	236,362	250,127	264,687	280,100	296,764
B.	Other Operating Revenue	39,202	40,554	41,955	43,105	44,608	46,163	47,775	49,444	51,173	52,964
C.	Employer/Municipal Payroll Tax	324,762	344,897	366,281	388,991	413,108	438,721	465,921	494,808	525,487	558,067
D.	Self Employed Tax	16,443	17,298	18,197	19,144	20,139	21,186	22,288	23,447	24,666	25,949
E.	State In-Lieu	3,460	3,633	3,815	4,006	4,206	4,416	4,637	4,869	5,112	5,368
F.	Grants & Capital Reimbursement	78,094	80,238	82,455	84,746	87,114	91,062	93,652	96,330	99,098	88,960
G.	Interest	0	0	0	0	0	0	0	0	0	0
H.	ATP-Cigarette Tax, Agency	4,215	4,360	4,512	4,672	4,840	5,016	5,201	5,395	5,599	5,813
I.	New Revenues	54,925	58,312	61,909	65,727	69,780	74,084	78,654	83,505	88,656	94,125
J.	Total Continuing Revenues (CR)	699,256	737,803	778,596	821,465	867,152	917,010	968,255	1,022,486	1,079,892	1,128,010
		5.7%	5.5%	5.5%	5.5%	5.6%	5.7%	5.6%	5.6%	5.6%	4.5%
	Expenditures, Current Service:										
K.	Bus Operations	258,899	271,378	284,671	298,841	314,239	330,811	348,536	367,510	387,838	409,631
L.	Light Rail Operations	67,129	70,541	74,178	78,057	82,274	86,815	91,675	96,880	102,461	108,448
M.	Commuter Rail Operations	7,982	7,473	7,889	8,283	8,494	8,832	9,185	9,553	9,937	10,336
N.	Streetcar to Lowell	9,282	9,700	10,136	10,592	11,069	11,567	12,088	12,632	13,200	13,794
O.	Field Operations	19,960	20,884	21,871	22,926	24,080	25,327	26,666	28,104	29,649	31,312
P.	Accessible Transportation Programs	74,458	78,831	83,537	88,547	93,883	99,633	105,765	111,924	118,467	125,418
Q.	Capital Projects & Facilities	29,514	30,981	32,536	34,186	35,960	37,855	39,872	42,021	44,310	46,752
R.	General & Administration/Security	129,437	140,221	151,837	164,715	178,792	195,803	214,634	233,663	254,724	278,069
S.	Capital and Operating Projects	15,075	17,217	16,339	18,486	17,627	23,157	22,766	24,958	21,557	23,274
T.	Debt Service	53,944	56,453	58,923	65,864	71,780	74,337	74,327	76,752	74,634	70,594
	Expenditures, Future Service										
U.	Bus Operations: Peak, Reliability, New	9,876	11,516	13,306	15,259	17,393	19,724	22,274	25,063	28,117	32,411
V.	Rail Operations: East/West, Airport, IMAX	5,374	6,079	6,852	7,699	8,628	9,649	10,769	12,001	13,355	14,456
W.	Rail Operations: I-205 LRT	14,133	14,795	15,501	16,255	17,059	17,919	18,838	23,562	24,816	25,472
X.	Rail Operations: Portland-Milwaukie LRT	11,094	11,605	12,149	12,728	14,379	15,104	15,878	16,708	17,597	18,062
Y.	Rail Operations: Portland Eastside Streetcar Contribution	1,599	1,671	1,746	1,825	1,907	1,993	2,083	2,176	2,274	2,377
Z.	Rail Operations: Columbia River Crossing	6,070	6,355	6,659	6,983	7,329	7,699	8,867	9,331	8,972	9,211
AA.	Continuing Expenditures Less Capital	692,681	732,128	775,130	825,778	879,936	935,368	992,591	1,058,550	1,121,379	1,187,132
AB.	Total Continuing Expenditures (CE)	707,756	749,345	791,470	844,264	897,563	958,525	1,015,357	1,083,508	1,142,936	1,210,406
AC.	General Fund Results	(8,499)	(11,541)	(12,874)	(22,799)	(30,411)	(41,515)	(47,101)	(61,022)	(63,044)	(82,397)
		5.2%	5.9%	5.6%	6.7%	6.3%	6.8%	5.9%	6.7%	5.5%	5.9%
AD.	Beginning Working Capital	(72,680)	(81,179)	(92,720)	(105,594)	(128,393)	(158,805)	(200,320)	(247,421)	(308,443)	(371,487)
AE.	Working Capital in Months of Operating Expense	(1.26)	(1.33)	(1.44)	(1.53)	(1.75)	(2.04)	(2.42)	(2.80)	(3.30)	(3.76)
AF.	Cash and Cash Equivalents *	(11,906)	(20,406)	(31,947)	(44,821)	(67,620)	(98,031)	(139,546)	(186,648)	(247,669)	(310,713)
AG.	Cash as a Percent of Operating Cost	-2%	-3%	-4%	-5%	-8%	-10%	-14%	-17%	-22%	-26%

Table 1. FY09 Unsolved Forecast

General Fund (YOE, 000s)

	(000s)	FY2028 FORECAST	FY2029 FORECAST	FY2030 FORECAST	Annual Percent Change FY2008-FY2030
	Revenues:				
A.	Passenger Revenue	314,422	333,131	352,954	6.93%
B.	Other Operating Revenue	54,820	56,741	58,732	3.06%
C.	Employer/Municipal Payroll Tax	592,667	629,412	668,436	5.89%
D.	Self Employed Tax	27,298	28,718	30,211	4.61%
E.	State In-Lieu	5,636	5,918	6,214	4.80%
F.	Grants & Capital Reimbursement	91,920	94,979	98,143	2.14%
G.	Interest	0	0	0	-100.00%
H.	ATP-Cigarette Tax, Agency	6,037	6,272	6,518	3.25%
I.	New Revenues	99,932	106,096	112,642	11.39%
J.	Total Continuing Revenues (CR)	1,192,730	1,261,267	1,333,849	5.68%
		5.7%	5.7%	5.8%	
	Expenditures, Current Service:				
K.	Bus Operations	433,016	458,126	485,111	5.07%
L.	Light Rail Operations	114,875	121,781	129,207	5.06%
M.	Commuter Rail Operations	10,753	11,188	11,641	19.08%
N.	Streetcar to Lowell	14,415	15,064	15,741	4.33%
O.	Field Operations	33,101	35,030	37,109	5.86%
P.	Accessible Transportation Programs	132,896	140,850	149,311	5.62%
Q.	Capital Projects & Facilities	49,358	52,142	55,117	4.61%
R.	General & Administration/Security	303,959	332,686	364,574	8.45%
S.	Capital and Operating Projects	23,066	24,833	24,624	1.64%
T.	Debt Service	71,686	68,372	60,931	5.04%
	Expenditures, Future Service				
U.	Bus Operations: Peak, Reliability, New	38,036	44,273	51,173	
V.	Rail Operations: East/West, Airport, IMAX	16,076	17,864	19,830	
W.	Rail Operations: I-205 LRT	26,915	28,465	30,120	
X.	Rail Operations: Portland-Milwaukie LRT	19,086	20,185	21,358	
Y.	Rail Operations: Portland Eastside Streetcar Contribution	2,483	2,595	2,712	
Z.	Rail Operations: Columbia River Crossing	9,733	10,294	10,893	
AA.	Continuing Expenditures Less Capital	1,266,657	1,348,621	1,433,937	6.36%
AB.	Total Continuing Expenditures (CE)	1,289,723	1,373,454	1,458,561	6.22%
AC.	General Fund Results	(96,993)	(112,187)	(124,712)	
		6.6%	6.5%	6.2%	
AD.	Beginning Working Capital	(453,883)	(550,876)	(663,062)	
AE.	Working Capital in Months of Operating Expense	(4.30)	(4.90)	(5.55)	-72%
AF.	Cash and Cash Equivalents *	(393,110)	(490,102)	(602,289)	
AG.	Cash as a Percent of Operating Cost	-30%	-36%	-41%	4%

Table 1. FY09 Unsolved Forecast

	FY2008 FORECAST	FY2009 FORECAST	FY2010 FORECAST	FY2011 FORECAST	FY2012 FORECAST	FY2013 FORECAST	FY2014 FORECAST	FY2015 FORECAST	FY2016 FORECAST	FY2017 FORECAST
Statistics										
1 Passenger Revenue	6.4%	15.7%	11.6%	7.0%	5.5%	5.8%	5.8%	5.8%	10.7%	8.9%
2 Payroll Tax	5.0%	2.0%	2.8%	3.2%	7.0%	9.5%	6.2%	6.2%	6.2%	6.2%
3 Self-Employed Tax	-2.7%	-2.0%	1.7%	5.5%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%
4 State in-lieu of Tax	-1.9%	0.7%	5.4%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
5 Interest Revenues	4.1%	3.0%	3.8%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
6 Percent Change Total Revenues	10.4%	3.0%	5.7%	4.4%	7.0%	7.5%	6.4%	6.0%	6.6%	6.3%
7 Bus Operations	5.7%	7.0%	4.2%	3.2%	4.8%	5.2%	5.0%	4.3%	4.4%	4.5%
8 Rail Operations	13.9%	8.9%	-2.3%	3.8%	5.1%	4.7%	5.3%	4.6%	4.7%	4.8%
9 Capital Projects and Facilities Maintenenace	13.3%	-5.9%	5.3%	5.1%	4.9%	5.2%	5.1%	3.8%	4.7%	4.8%
10 G & A	16.3%	10.4%	8.4%	4.8%	7.4%	7.8%	7.8%	7.6%	7.7%	7.8%
11 ATP/OMAP	7.9%	6.4%	4.3%	2.2%	2.4%	3.2%	5.9%	7.4%	7.7%	6.6%
12 Weighted Average Cost Inflation		1.045	1.034	1.044	1.044	1.036	1.046	1.044	1.044	1.045
13 Bus Service Additions	-	-	9,865	19,780	29,744	39,758	49,822	59,937	70,102	80,318
14 Rail Marginal Operating Cost Per Train Platform Hour	$ 46.27	$ 48.36	$ 50.00	$ 52.18	$ 54.46	$ 56.43	$ 59.02	$ 61.62	$ 64.36	$ 67.27
15 Rail Marginal Operating Cost Per Car Platform Mile	$ 2.00	$ 2.09	$ 2.16	$ 2.25	$ 2.35	$ 2.44	$ 2.55	$ 2.66	$ 2.78	$ 2.90
16 Bus Operating Cost per Vehicle Hour	$ 60.28	$ 74.92	$ 77.47	$ 80.84	$ 84.37	$ 87.43	$ 91.44	$ 95.47	$ 99.71	$ 104.22
17 East/West/Airport/Interstate Train Platform Hours	238,672	242,570	242,577	255,181	257,712	260,296	262,934	265,627	268,376	270,643
18 East/West/Airport/Interstate Car Platform Miles	6,654,512	7,033,987	7,242,450	7,484,624	7,570,053	7,656,967	7,745,392	7,835,356	7,926,885	8,012,366
19 LIFT Growth		3.3%	1.5%	0.5%	0.5%	0.5%	0.5%	1.6%	2.3%	2.3%
20 LIFT Service Hours (excludes cab)	566,423	585,115	593,891	596,861	599,845	602,844	605,859	615,552	629,710	644,193
21 Farebox Recovery Ratio-Fixed Route	26.0%	27.9%	28.7%	29.4%	29.4%	29.3%	29.3%	29.4%	30.3%	31.3%
22 Labor Cost Growth	0	0	13,682	7,457	12,043	13,963	13,963	12,274	13,100	13,994
23 Materials and Services Cost Growth:										
24 Bus Operations			(780)	1,651	1,735	1,823	1,916	2,014	2,118	2,227
25 Rail Operations			715	551	505	533	562	593	626	661
26 Field Operations			8	8	9	9	9	9	10	10
27 Capital Projects and Facilities Maintenance			157	606	405	426	449	474	500	527
28 General and Administration			2,678	2,529	3,906	4,393	4,926	5,440	6,017	6,585
29 Total Materials and Services Cost Growth	-	-	2,778	5,345	6,558	7,184	7,862	8,530	9,269	10,010
30 Adjustments to Budget	-	5,640								
31 Fiscal Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
32 Total Bus Hours	1,967,106	1,967,106	1,976,971	1,986,886	1,996,850	2,006,864	2,016,928	2,027,043	2,037,208	2,047,424
33 Total Rail Hours	238,672	249,070	311,025	323,629	326,160	328,744	331,382	371,159	377,729	379,996
34 Streetcar	37,820	37,820	37,820	52,451	52,451	52,451	52,451	52,451	52,451	52,451
35 Total Bus and Rail Hours	2,243,598	2,253,996	2,325,816	2,362,966	2,375,462	2,388,059	2,400,761	2,450,652	2,467,387	2,479,871
36 Bus and Rail Cost per Hour	165.52	178.83	188.44	193.78	206.11	216.38	228.31	236.48	252.11	264.81
37 Percent Change Bus/Rail Cost per Hour	1.090	1.080	1.054	1.028	1.064	1.050	1.055	1.036	1.066	1.050
38 Shelter/Customer Amenities Maintenance	82	86	88	91	94	97	99	102	105	109
39 License Fees	-	120	120	125	131	137	143	150	156	163
40 LIFT Fares in Passenger Revenue	1,179	1,303	1,306	1,311	1,315	1,370	1,452	1,549	1,717	1,809

Table 1. FY09 Unsolved Forecast

	FY2018 FORECAST	FY2019 FORECAST	FY2020 FORECAST	FY2021 FORECAST	FY2022 FORECAST	FY2023 FORECAST	FY2024 FORECAST	FY2025 FORECAST	FY2026 FORECAST	FY2027 FORECAST
Statistics										
1 Passenger Revenue	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.9%
2 Payroll Tax	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%
3 Self-Employed Tax	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%
4 State in-lieu of Tax	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
5 Interest Revenues	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
6 Percent Change Total Revenues	5.7%	5.5%	5.5%	5.5%	5.6%	5.7%	5.6%	5.6%	5.6%	4.5%
7 Bus Operations	4.6%	4.8%	4.9%	5.0%	5.2%	5.3%	5.4%	5.4%	5.5%	5.6%
8 Rail Operations	4.9%	5.1%	5.2%	5.2%	5.4%	5.5%	5.6%	5.7%	5.8%	5.8%
9 Capital Projects and Facilities Maintenenace	4.8%	5.0%	5.0%	5.1%	5.2%	5.3%	5.3%	5.4%	5.4%	5.5%
10 G & A	8.1%	8.3%	8.3%	8.5%	8.5%	9.5%	9.6%	8.9%	9.0%	9.2%
11 ATP/OMAP	5.8%	5.9%	6.0%	6.0%	6.0%	6.1%	6.2%	5.8%	5.8%	5.9%
12 Weighted Average Cost Inflation	1.046	1.047	1.048	1.049	1.049	1.050	1.051	1.052	1.053	1.026
13 Bus Service Additions	90,585	100,903	111,273	121,694	132,168	142,694	153,273	163,905	174,590	196,066
14 Rail Marginal Operating Cost Per Train Platform Hour	$ 70.37	$ 73.67	$ 77.18	$ 80.93	$ 84.94	$ 89.22	$ 93.80	$ 98.70	$ 103.95	$ 106.70
15 Rail Marginal Operating Cost Per Car Platform Mile	$ 3.04	$ 3.18	$ 3.33	$ 3.49	$ 3.67	$ 3.85	$ 4.05	$ 4.26	$ 4.49	$ 4.61
16 Bus Operating Cost per Vehicle Hour	$ 109.02	$ 114.13	$ 119.58	$ 125.39	$ 131.60	$ 138.23	$ 145.32	$ 152.91	$ 161.05	$ 165.31
17 East/West/Airport/Interstate Train Platform Hours	272,949	275,294	277,678	280,102	282,567	285,074	287,623	290,215	292,850	295,530
18 East/West/Airport/Interstate Car Platform Miles	8,099,203	8,187,418	8,277,031	8,368,068	8,460,549	8,554,499	8,649,941	8,746,900	8,845,400	8,945,466
19 LIFT Growth	2.4%	2.4%	2.5%	2.5%	2.5%	2.6%	2.6%	2.1%	2.1%	2.1%
20 LIFT Service Hours (excludes cab)	659,654	675,486	692,373	709,682	727,424	746,337	765,742	781,823	798,241	815,004
21 Farebox Recovery Ratio-Fixed Route	31.2%	31.2%	31.2%	31.1%	30.9%	30.7%	30.5%	30.1%	29.9%	29.6%
22 Labor Cost Growth	14,961	16,609	17,745	18,977	20,774	22,472	24,121	25,913	27,862	29,982
23 Materials and Services Cost Growth:										
24 Bus Operations	2,342	2,464	2,592	2,727	2,870	3,021	3,181	3,349	3,527	3,714
25 Rail Operations	698	738	780	825	872	923	977	1,034	1,095	1,160
26 Field Operations	10	10	11	11	11	12	12	13	13	13
27 Capital Projects and Facilities Maintenance	556	587	620	655	692	732	774	819	866	917
28 General and Administration	7,509	8,346	9,016	10,102	11,049	13,742	15,329	15,272	17,029	19,014
29 Total Materials and Services Cost Growth	11,115	12,145	13,019	14,320	15,495	18,430	20,272	20,486	22,530	24,818
30 Adjustments to Budget										
31 Fiscal Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
32 Total Bus Hours	2,057,691	2,068,009	2,078,379	2,088,800	2,099,274	2,109,800	2,120,379	2,131,011	2,141,696	2,163,172
33 Total Rail Hours	382,302	388,998	391,382	393,806	398,595	401,102	403,651	406,243	408,878	411,558
34 Streetcar	52,451	52,451	52,451	52,451	52,451	52,451	52,451	52,451	52,451	52,451
35 Total Bus and Rail Hours	2,492,444	2,509,458	2,522,212	2,535,058	2,550,321	2,563,353	2,576,481	2,589,705	2,603,025	2,627,181
36 Bus and Rail Cost per Hour	277.91	291.75	307.32	325.74	345.03	364.90	385.25	408.75	430.80	451.87
37 Percent Change Bus/Rail Cost per Hour	1.049	1.050	1.053	1.060	1.059	1.058	1.056	1.061	1.054	1.049
38 Shelter/Customer Amenities Maintenance	112	115	119	122	126	130	134	138	142	146
39 License Fees	171	178	186	195	204	213	222	232	243	254
40 LIFT Fares in Passenger Revenue	1,908	2,012	2,125	2,243	2,368	2,503	2,645	2,781	2,925	3,076

Table 1. FY09 Unsolved Forecast

		FY2028 FORECAST	FY2029 FORECAST	FY2030 FORECAST
	Statistics			
1	Passenger Revenue	6.0%	6.0%	6.0%
2	Payroll Tax	6.2%	6.2%	6.2%
3	Self-Employed Tax	5.2%	5.2%	5.2%
4	State in-lieu of Tax	5.0%	5.0%	5.0%
5	Interest Revenues	4.0%	4.0%	4.0%
6	Percent Change Total Revenues	5.7%	5.7%	5.8%
7	Bus Operations	5.7%	5.8%	5.9%
8	Rail Operations	5.9%	6.0%	6.1%
9	Capital Projects and Facilities Maintenenace	5.6%	5.6%	5.7%
10	G & A	9.3%	9.5%	9.6%
11	ATP/OMAP	6.0%	6.0%	6.0%
12	Weighted Average Cost Inflation	1.057	1.058	1.058
13	Bus Service Additions	217,758	239,666	261,793
14	Rail Marginal Operating Cost Per Train Platform Hour	$ 112.74	$ 119.23	$ 126.17
15	Rail Marginal Operating Cost Per Car Platform Mile	$ 4.87	$ 5.15	$ 5.45
16	Bus Operating Cost per Vehicle Hour	$ 174.67	$ 184.73	$ 195.47
17	East/West/Airport/Interstate Train Platform Hours	298,255	301,026	303,844
18	East/West/Airport/Interstate Car Platform Miles	9,047,123	9,150,397	9,255,314
19	LIFT Growth	2.2%	2.2%	2.2%
20	LIFT Service Hours (excludes cab)	832,934	851,259	869,986
21	Farebox Recovery Ratio-Fixed Route	29.3%	28.9%	28.6%
22	Labor Cost Growth	32,292	34,807	37,548
23	Materials and Services Cost Growth:			
24	Bus Operations	3,913	4,122	4,343
25	Rail Operations	1,229	1,302	1,380
26	Field Operations	14	14	15
27	Capital Projects and Facilities Maintenance	970	1,028	1,089
28	General and Administration	21,233	23,716	26,493
29	Total Materials and Services Cost Growth	27,359	30,182	33,319
30	Adjustments to Budget			
31	Fiscal Year	2028	2029	2030
32	Total Bus Hours	2,184,864	2,206,772	2,228,899
33	Total Rail Hours	414,283	417,054	419,872
34	Streetcar	52,451	52,451	52,451
35	Total Bus and Rail Hours	2,651,598	2,676,277	2,701,222
36	Bus and Rail Cost per Hour	477.70	503.92	530.85
37	Percent Change Bus/Rail Cost per Hour	1.057	1.055	1.053
38	Shelter/Customer Amenities Maintenance	150	155	160
39	License Fees	265	277	289
40	LIFT Fares in Passenger Revenue	3,238	3,408	3,588

Table 1. FY09 Unsolved Forecast

Capital Fund (Line S.) Inflated Dollars **Capital Revenues:**	FY2008 FORECAST	FY2009 FORECAST	FY2010 FORECAST	FY2011 FORECAST	FY2012 FORECAST	FY2013 FORECAST	FY2014 FORECAST	FY2015 FORECAST	FY2016 FORECAST	FY2017 FORECAST
Tri-Met Resources:										
1. Beginning Fund Balance										
o Vehicle Replacement Reserve	-	-	-	-	-	-	-	-	-	-
o Bond Proceeds/Debt Financing	6,415	42,126	35,039	33,699	69,233	29,772	44,056	37,503	19,161	23,694
o Capital Fund Balance	0	0	0	0	0	0	0	0	0	0
o Other										
2. Transfer from General Fund	17,233	20,732	11,334	9,978	6,474	10,376	10,597	12,303	13,920	15,978
Federal Grant Resources:										
3. Section 9 Formula (Continuing)										
4. Other Grants	5,779	19,249	8,458	6,494	7,518	2,084	3,127	2,173	3,219	2,267
5. Carryover	0	0	0	0	0	0	0	0	0	0
6. Total Grant Resources	5,779	19,249	8,458	6,494	7,518	2,084	3,127	2,173	3,219	2,267
7. Total Resources	29,427	82,107	54,832	50,172	83,225	42,232	57,780	51,979	36,300	41,940
Capital Expenditures:										
8. Replacement	9,676	31,924	45,656	45,535	32,842	31,940	42,635	45,510	29,313	34,150
9. Improvement	19,751	50,183	9,175	4,636	50,383	10,292	15,145	6,469	6,987	7,789
10. Total Expenditures	29,427	82,107	54,832	50,172	83,225	42,232	57,780	51,979	36,300	41,940
11. Eligible for Federal, State Funds	5,779	19,249	8,458	6,494	7,518	2,084	3,127	2,173	3,219	2,267
12. Tri-Met Funds Required	23,648	62,858	46,373	43,677	75,707	40,148	54,653	49,806	33,081	39,673

Table 1. FY09 Unsolved Forecast

Capital Fund (Line S.) Inflated Dollars **Capital Revenues:**	FY2018 FORECAST	FY2019 FORECAST	FY2020 FORECAST	FY2021 FORECAST	FY2022 FORECAST	FY2023 FORECAST	FY2024 FORECAST	FY2025 FORECAST	FY2026 FORECAST	FY2027 FORECAST
Tri-Met Resources:										
1. Beginning Fund Balance										
o Vehicle Replacement Reserve	-	-	-	-	-	-	-	-		
o Bond Proceeds/Debt Financing	44,225	26,537	26,002	84,334	180,055	26,959	0	25,562	26,595	100,242
o Capital Fund Balance	0	0	0	0	0	0	0	0		
o Other										
2. Transfer from General Fund	15,075	17,217	16,339	18,486	17,627	23,157	22,766	24,958	21,557	23,274
Federal Grant Resources:										
3. Section 9 Formula (Continuing)										
4. Other Grants	3,316	2,367	3,419	2,473	3,528	2,585	3,644	2,705	3,767	2,831
5. Carryover	0	0	0	0	0	0	0	0	0	0
6. Total Grant Resources	3,316	2,367	3,419	2,473	3,528	2,585	3,644	2,705	3,767	2,831
7. Total Resources	62,616	46,120	45,760	105,292	201,210	52,702	26,410	53,225	51,919	126,347
Capital Expenditures:										
8. Replacement	36,325	37,630	37,428	39,564	192,176	42,654	16,502	42,212	43,745	50,396
9. Improvement	26,291	8,490	8,332	65,728	9,034	10,048	9,908	11,012	8,174	75,951
10. Total Expenditures	62,616	46,120	45,760	105,292	201,210	52,702	26,410	53,225	51,919	126,347
11. Eligible for Federal, State Funds	3,316	2,367	3,419	2,473	3,528	2,585	3,644	2,705	3,767	2,831
12. Tri-Met Funds Required	59,300	43,754	42,341	102,820	197,682	50,116	22,766	50,520	48,152	123,516

Table 1. FY09 Unsolved Forecast

Capital Fund (Line S.) Inflated Dollars **Capital Revenues:**	FY2028 FORECAST	FY2029 FORECAST	FY2030 FORECAST
Tri-Met Resources:			
1. Beginning Fund Balance			
o Vehicle Replacement Reserve			
o Bond Proceeds/Debt Financing	35,321	36,694	36,077
o Capital Fund Balance			
o Other			
2. Transfer from General Fund	23,066	24,833	24,624
Federal Grant Resources:			
3. Section 9 Formula (Continuing)			
4. Other Grants	3,898	2,966	4,036
5. Carryover	0	0	0
6. Total Grant Resources	3,898	2,966	4,036
7. Total Resources	62,284	64,492	64,737
Capital Expenditures:			
8. Replacement	53,515	55,434	55,379
9. Improvement	8,769	9,058	9,358
10. Total Expenditures	62,284	64,492	64,737
11. Eligible for Federal, State Funds	3,898	2,966	4,036
12. Tri-Met Funds Required	58,386	61,526	60,701

Table 1. FY09 Solved Forecast

General Fund (YOE, 000s)

(000s)	FY2008 FORECAST	FY2009 FORECAST	FY2010 FORECAST	FY2011 FORECAST	FY2012 FORECAST	FY2013 FORECAST	FY2014 FORECAST	FY2015 FORECAST	FY2016 FORECAST	FY2017 FORECAST
Revenues:										
A. Passenger Revenue	80,821	93,532	103,546	110,392	116,479	123,246	130,433	138,047	152,918	166,662
B. Other Operating Revenue	30,254	29,250	31,582	32,713	32,910	33,108	34,243	35,418	36,636	37,896
C. Employer/Municipal Payroll Tax	189,615	193,407	198,822	205,185	219,548	240,405	255,310	271,139	287,950	305,802
D. Self Employed Tax	11,200	10,976	11,163	11,531	12,131	12,761	13,425	14,123	14,857	15,630
E. State In-Lieu	2,215	2,231	2,351	2,459	2,582	2,711	2,847	2,989	3,138	3,295
F. Grants & Capital Reimbursement	61,633	70,530	58,828	58,889	64,152	66,829	68,547	70,322	72,156	74,576
G. Interest	6,463	3,326	3,352	3,734	3,978	2,181	4,258	4,669	5,181	5,520
H. ATP-Cigarette Tax, Agency	3,223	3,200	3,291	3,386	3,486	3,593	3,704	3,822	3,947	4,077
I. New Revenues	10,505	13,982	17,746	21,802	27,012	33,596	39,991	45,899	48,730	51,735
J. Total Continuing Revenues (CR)	395,929	420,435	430,680	450,090	482,278	518,430	552,758	586,430	625,513	665,195
	10.4%	6.2%	2.4%	4.5%	7.2%	7.5%	6.6%	6.1%	6.7%	6.3%
Expenditures, Current Service:										
K. Bus Operations	163,412	174,786	173,901	179,724	188,720	198,963	209,298	218,713	228,730	239,395
L. Light Rail Operations	43,655	47,522	44,264	46,016	48,460	50,821	53,631	56,200	58,935	61,849
M. Commuter Rail Operations	250	2,436	5,216	5,328	5,536	6,526	6,197	6,324	6,518	6,775
N. Streetcar to Lowell	6,192	6,246	6,527	6,821	7,128	7,448	7,784	8,134	8,500	8,882
O. Field Operations	10,607	13,194	13,547	13,966	14,637	15,413	16,190	16,875	17,605	18,384
P. Accessible Transportation Programs	44,874	47,764	49,842	50,927	52,173	53,866	57,021	61,258	65,966	70,346
Q. Capital Projects & Facilities	20,459	19,245	19,653	20,692	21,745	22,910	24,101	25,050	26,257	27,537
R. General & Administration/Security	61,247	67,591	71,420	74,950	80,624	87,054	94,022	101,281	109,236	117,887
S. Capital and Operating Projects	17,233	22,233	4,276	3,720	6,446	10,347	10,567	12,272	13,888	15,946
T. Debt Service	20,653	24,674	28,288	30,629	39,074	47,022	45,490	46,949	48,887	51,079
Expenditures, Future Service										
U. Bus Operations: Peak, Reliability, New			-	-	832	1,728	2,718	3,793	4,965	6,243
V. Rail Operations: East/West, Airport, IMAX			0	34	365	726	1,131	1,575	2,065	2,548
W. Rail Operations: I-205 LRT			9,360	10,479	10,937	11,333	11,853	12,375	12,926	13,510
X. Rail Operations: Portland-Milwaukie LRT								-	10,162	10,613
Y. Rail Operations: Portland Eastside Streetcar Contribution					819	1,283	1,341	1,401	1,464	1,530
Z. Rail Operations: Columbia River Crossing									5,551	5,803
AA. Continuing Expenditures Less Capital	371,350	403,459	422,020	439,566	471,050	505,094	530,777	559,929	602,216	636,580
AB. Total Continuing Expenditures (CE)	388,583	425,692	426,295	443,286	477,496	515,441	541,345	572,201	616,104	652,526
AC. General Fund Results	7,346	(5,257)	4,385	6,803	4,782	2,989	11,414	14,229	9,409	12,669
	12.7%	9.5%	0.1%	4.0%	7.7%	7.9%	5.0%	5.7%	7.7%	5.9%
AD. Beginning Working Capital	36,477	43,808	38,551	42,936	49,740	54,522	57,511	68,925	83,154	92,563
AE. Working Capital in Months of Operating Expense	1.18	1.30	1.10	1.17	1.27	1.30	1.30	1.48	1.66	1.74
AF. Cash and Cash Equivalents *	89,855	104,581	99,325	103,710	110,513	115,295	118,285	129,698	143,927	153,336
AG. Cash as a Percent of Operating Cost	23%	25%	23%	23%	23%	22%	22%	23%	23%	23%

Table 1. FY09 Solved Forecast

General Fund (YOE, 000s)

(000s)	FY2018 FORECAST	FY2019 FORECAST	FY2020 FORECAST	FY2021 FORECAST	FY2022 FORECAST	FY2023 FORECAST	FY2024 FORECAST	FY2025 FORECAST	FY2026 FORECAST	FY2027 FORECAST
Revenues:										
A. Passenger Revenue	176,358	186,622	197,488	208,991	221,168	234,061	247,710	262,147	277,763	294,308
B. Other Operating Revenue	39,202	40,554	41,955	43,105	44,608	46,163	47,775	49,444	51,173	52,964
C. Employer/Municipal Payroll Tax	324,762	344,897	366,281	388,991	413,108	438,721	465,921	494,808	525,487	558,067
D. Self Employed Tax	16,443	17,298	18,197	19,144	20,139	21,186	22,288	23,447	24,666	25,949
E. State In-Lieu	3,460	3,633	3,815	4,006	4,206	4,416	4,637	4,869	5,112	5,368
F. Grants & Capital Reimbursement	78,094	80,238	82,455	84,746	87,114	91,062	93,652	96,330	99,098	88,960
G. Interest	5,976	6,556	7,054	7,525	7,638	7,440	6,845	5,188	3,826	2,375
H. ATP-Cigarette Tax, Agency	4,215	4,360	4,512	4,672	4,840	5,016	5,201	5,395	5,599	5,813
I. New Revenues	54,925	58,312	61,909	65,727	69,780	74,084	78,654	83,505	88,656	94,125
J. Total Continuing Revenues (CR)	703,435	742,471	783,666	826,905	872,600	922,149	972,684	1,025,134	1,081,381	1,127,929
	5.7%	5.5%	5.5%	5.5%	5.5%	5.7%	5.5%	5.4%	5.5%	4.3%
Expenditures, Current Service:										
K. Bus Operations	250,759	263,238	276,530	290,701	306,098	322,670	340,396	359,370	379,697	401,491
L. Light Rail Operations	64,955	68,367	72,004	75,884	80,101	84,641	89,501	94,707	100,287	106,274
M. Commuter Rail Operations	7,982	7,473	7,889	8,283	8,494	8,832	9,185	9,553	9,937	10,336
N. Streetcar to Lowell	9,282	9,700	10,136	10,592	11,069	11,567	12,088	12,632	13,200	13,794
O. Field Operations	19,217	20,141	21,128	22,183	23,337	24,585	25,924	27,361	28,907	30,569
P. Accessible Transportation Programs	74,458	78,831	83,537	88,547	93,883	99,633	105,765	111,924	118,467	125,418
Q. Capital Projects & Facilities	28,893	30,360	31,915	33,565	35,339	37,234	39,251	41,400	43,689	46,131
R. General & Administration/Security	127,601	138,385	150,001	162,879	176,956	193,967	212,798	231,827	252,888	276,233
S. Capital and Operating Projects	15,041	17,182	16,304	18,449	17,589	23,118	46,292	24,917	21,515	23,230
T. Debt Service	51,602	54,053	56,622	64,208	71,442	73,934	73,925	76,349	73,927	69,933
Expenditures, Future Service										
U. Bus Operations: Peak, Reliability, New	7,638	9,161	10,826	12,645	14,635	16,812	19,196	21,808	24,671	28,837
V. Rail Operations: East/West, Airport, IMAX	3,079	3,664	4,309	5,018	5,800	6,661	7,611	8,660	9,817	10,803
W. Rail Operations: I-205 LRT	14,133	14,795	15,501	16,255	17,059	17,919	18,838	23,562	24,816	25,472
X. Rail Operations: Portland-Milwaukie LRT	11,094	11,605	12,149	12,728	14,379	15,104	15,878	16,708	17,597	18,062
Y. Rail Operations: Portland Eastside Streetcar Contribution	1,599	1,671	1,746	1,825	1,907	1,993	2,083	2,176	2,274	2,377
Z. Rail Operations: Columbia River Crossing	6,070	6,355	6,659	6,983	7,329	7,699	8,867	9,331	8,972	9,211
AA. Continuing Expenditures Less Capital	672,293	711,445	754,293	805,314	860,499	915,553	972,439	1,038,037	1,100,174	1,165,731
AB. Total Continuing Expenditures (CE)	687,335	728,627	770,597	823,763	878,088	938,671	1,018,731	1,062,954	1,121,688	1,188,961
AC. General Fund Results	16,100	13,844	13,069	3,142	(5,488)	(16,521)	(46,048)	(37,820)	(40,308)	(61,032)
	5.3%	6.0%	5.8%	6.9%	6.6%	6.9%	8.5%	4.3%	5.5%	6.0%
AD. Beginning Working Capital	105,232	121,332	135,176	148,245	151,388	145,900	129,378	83,330	45,510	5,202
AE. Working Capital in Months of Operating Expense	1.88	2.05	2.15	2.21	2.11	1.91	1.60	0.96	0.50	0.05
AF. Cash and Cash Equivalents *	166,005	182,106	195,949	209,019	212,161	206,673	190,152	144,104	106,283	65,976
AG. Cash as a Percent of Operating Cost	24%	25%	25%	25%	24%	22%	19%	14%	9%	6%

Table 1. FY09 Solved Forecast

General Fund (YOE, 000s)

	(000s)	FY2028 FORECAST	FY2029 FORECAST	FY2030 FORECAST	Annual Percent Change FY2008-FY2030
	Revenues:				
A.	Passenger Revenue	311,841	330,420	350,106	6.89%
B.	Other Operating Revenue	54,820	56,741	58,732	3.06%
C.	Employer/Municipal Payroll Tax	592,667	629,412	668,436	5.89%
D.	Self Employed Tax	27,298	28,718	30,211	4.61%
E.	State In-Lieu	5,636	5,918	6,214	4.80%
F.	Grants & Capital Reimbursement	91,920	94,979	98,143	2.14%
G.	Interest	178	0	0	-100.00%
H.	ATP-Cigarette Tax, Agency	6,037	6,272	6,518	3.25%
I.	New Revenues	99,932	106,096	112,642	11.39%
J.	Total Continuing Revenues (CR)	1,190,328	1,258,556	1,331,001	5.67%
		5.5%	5.7%	5.8%	
	Expenditures, Current Service:				
K.	Bus Operations	424,875	449,986	476,970	4.99%
L.	Light Rail Operations	112,702	119,608	127,033	4.97%
M.	Commuter Rail Operations	10,753	11,188	11,641	19.08%
N.	Streetcar to Lowell	14,415	15,064	15,741	4.33%
O.	Field Operations	32,359	34,287	36,367	5.76%
P.	Accessible Transportation Programs	132,896	140,850	149,311	5.62%
Q.	Capital Projects & Facilities	48,737	51,521	54,496	4.55%
R.	General & Administration/Security	302,123	330,850	362,738	8.42%
S.	Capital and Operating Projects	23,021	24,786	24,576	1.63%
T.	Debt Service	71,113	67,849	60,460	5.00%
	Expenditures, Future Service				
U.	Bus Operations: Peak, Reliability, New	34,220	40,196	46,814	
V.	Rail Operations: East/West, Airport, IMAX	12,195	13,736	15,436	
W.	Rail Operations: I-205 LRT	26,915	28,465	30,120	
X.	Rail Operations: Portland-Milwaukie LRT	19,086	20,185	21,358	
Y.	Rail Operations: Portland Eastside Streetcar Contribution	2,483	2,595	2,712	
Z.	Rail Operations: Columbia River Crossing	9,733	10,294	10,893	
AA.	Continuing Expenditures Less Capital	1,244,873	1,326,379	1,411,199	6.23%
AB.	Total Continuing Expenditures (CE)	1,267,894	1,351,165	1,435,776	6.10%
AC.	General Fund Results	(77,566)	(92,609)	(104,775)	
		6.6%	6.6%	6.3%	
AD.	Beginning Working Capital	(55,830)	(133,396)	(226,005)	
AE.	Working Capital in Months of Operating Expense	(0.54)	(1.21)	(1.92)	158%
AF.	Cash and Cash Equivalents *	4,943	(72,623)	(165,232)	
AG.	Cash as a Percent of Operating Cost	0%	-5%	-12%	23%

Table 2. New Revenues and New Services

New Revenues-New Service (net of fares)

		FY2005	**FY2006**	**FY2007**	**FY2008**	**FY2009**	**FY2010**	**FY2011**	**FY2012**	**FY2013**	**FY2014**	**FY2015**	**FY2016**
1	Green Line, Commuter Rail Debt Service	3,479,022		-	193,384	2,816,905	2,801,890	2,789,491	2,775,045	2,758,551	2,740,010	2,723,858	2,705,430
2	Commuter Rail Operations				-	1,555,013	2,567,039	2,292,194	2,451,456	5,388,400	5,002,793	5,060,785	5,181,220
4	Green Line						6,129,171	5,658,105	5,651,459	5,546,720	5,525,676	5,463,644	5,383,552
5	LIFT	1,734,113	2,971,323	3,607,708	5,582,145	5,485,366	4,967,794	5,374,112	5,808,914	6,274,049	6,771,486	7,727,465	9,054,966
6	Streetcar to Riverplace, Gibbs, Lowell, OMSI	120,400	412,801	959,430	1,313,822	1,353,236	1,393,834	2,254,649	2,786,288	2,911,671	3,042,696	3,179,618	3,322,700
7	Milwaukie Net of Fares (to Park Avenue)								-	-	-	-	3,415,366
8	Milwaukie Project Funding -$40M (includes CTR Street Parking Facility)								3,224,868	3,224,868	3,224,868	3,224,868	3,224,868
9	Columbia River Crossing												5,550,961
10	Red Line Service to Willow Creek					1,117,156	1,167,428	1,219,962	1,274,861	1,332,229	1,392,180	1,454,828	1,520,295
11	Additional Rail Service						-	1,673,161	2,084,853	2,517,963	3,014,490	3,552,499	4,141,664
12	Additional Bus Service FY09					550,000	-	-	-	-	-	-	-
13	Commuter Rail Cost Increases				-	1,103,336	1,103,336	1,103,336	1,103,336	1,103,336	1,103,336	1,103,336	1,103,336
14	Green Line Related General Fund Expenses					1,100,000	1,100,000	-	-	-	-	-	-
15	Total New Service Costs (net of fares, contributions) New Services	5,333,535	3,384,124	4,567,138	7,089,351	15,081,011	21,230,491	22,365,010	27,161,079	31,057,788	31,817,534	33,490,899	44,604,358
16	New Revenues	639,000	3,610,462	6,945,552	10,505,351	13,982,460	17,746,072	21,802,317	27,012,246	33,596,187	39,991,062	45,899,424	48,729,745
17	New Revenues Minus New Services	(4,694,535)	226,338	2,378,413	3,416,000	(1,098,551)	(3,484,419)	(562,693)	(148,833)	2,538,400	8,173,528	12,408,525	4,125,386
18	Cumulative New Service Minus Revenues	(4,694,535)	(4,468,196)	(2,089,783)	1,326,217	227,667	(3,256,753)	(3,819,446)	(3,968,279)	(1,429,879)	6,743,648	19,152,173	23,277,559

Table 2. New Revenues and New Services

New Revenues-New Service (net of fares)

		FY2017	FY2018	FY2019	FY2020	FY2021
1	Green Line, Commuter Rail Debt Service	2,689,164	2,674,831	2,665,072	2,660,158	2,657,519
2	Commuter Rail Operations	5,360,273	6,483,952	6,483,952	5,885,468	6,207,262
4	Green Line	5,288,423	5,177,263	5,049,050	4,902,733	4,737,241
5	LIFT	10,511,499	12,154,609	13,955,539	15,981,067	18,199,279
6	Streetcar to Riverplace, Gibbs, Lowell, OMSI	3,472,222	3,628,472	3,791,753	3,962,382	4,140,689
7	Milwaukie Net of Fares (to Park Avenue)	3,554,653	3,707,917	3,876,737	4,062,858	4,268,216
8	Milwaukie Project Funding -$40M (includes CTR Street Parking Facility)	3,224,868	3,224,868	3,224,868	3,224,868	3,224,868
9	Columbia River Crossing	5,802,592	6,070,305	6,355,381	6,659,216	6,983,332
10	Red Line Service to Willow Creek	1,588,708	1,660,200	1,734,909	1,812,980	1,894,564
11	Additional Rail Service	4,729,855	5,373,743	6,078,948	6,851,711	7,698,972
12	Additional Bus Service FY09	-	-	-	-	-
13	Commuter Rail Cost Increases	1,103,336	1,103,336	1,103,336	1,103,336	1,103,336
14	Green Line Related General Fund Expenses	-	-	-	-	-
15	Total New Service Costs (net of fares, contributions)	47,325,593	51,259,497	54,319,544	57,106,777	61,115,278
	New Services					
16	New Revenues	51,734,696	54,925,058	58,312,277	61,908,506	65,726,649
17	New Revenues Minus New Services	4,409,103	3,665,561	3,992,733	4,801,730	4,611,372
18	Cumulative New Service Minus Revenues	27,686,662	31,352,223	35,344,956	40,146,686	44,758,058

Table 3.
Passenger Revenue Forecast

	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19
MAX Boardings Avg. Wkdy												
Blue	67,800	70,326	72,435	74,608	76,847	79,152	81,527	83,972	86,492	89,086	91,759	94,512
Red	26,100	27,072	27,884	28,721	29,583	30,470	31,384	32,326	33,295	34,294	35,323	36,383
Yellow Interstate	13,500	14,003	14,423	15,856	16,331	16,821	17,326	17,846	18,381	18,932	19,500	20,085
Green		-	21,042	26,298	27,389	28,526	29,710	30,943	32,227	33,564	34,957	36,408
Yellow Milwaukie									21,548	21,896	22,249	22,608
Yellow CRC										11,500	14,151	14,511
Total MAX Wkdy Boardings	107,400	111,401	135,784	145,483	150,150	154,969	159,946	165,086	191,943	197,773	203,789	209,996
	3.1%	*3.7%*	*21.9%*									
Additional Bus Vehicle Hrs	0	0	6,049	10,192	9,916	9,966	10,016	10,066	10,116	10,167	10,218	10,269
Additional Bus Boardings	-	-	60,493	234,416	228,075	229,215	230,361	231,513	232,670	233,834	235,003	236,178
Commuter Rail Ridership	-	209,948	541,775	565,559	590,387	616,305	643,361	671,604	701,088	731,866	763,995	797,534
Annual MAX Boardings	35,250,800	36,428,013	44,464,603	48,009,332	49,549,413	51,139,837	52,782,288	54,478,505	63,341,127	69,060,106	71,920,142	74,087,351
Annualization			*22.1%*									
Annual Bus Boardings	63,980,400	67,292,585	68,533,949	69,528,244	70,840,883	72,486,916	74,167,015	75,881,868	77,225,108	79,003,444	80,818,516	82,671,064
Annual LIFT Boardings	1,122,044	1,159,071	1,156,127	1,126,739	1,097,469	1,109,473	1,142,174	1,182,343	1,272,688	1,301,960	1,333,207	1,365,204
Annual Comm Rail Boardings	-	209,948	541,775	565,559	590,387	616,305	643,361	671,604	701,088	731,866	763,995	797,534
Total Boardings	100,353,244	105,089,617	114,696,454	119,229,874	122,078,152	125,352,531	128,734,838	132,214,321	142,540,011	150,097,375	154,835,859	158,921,152
Avg. MAX Boarding Fare	$ 0.8974	$ 0.9886	$ 1.003	$ 1.03	$ 1.06	$ 1.10	$ 1.13	$ 1.16	$ 1.20	$ 1.23	$ 1.27	$ 1.31
Avg. Bus Boarding Fare	$ 0.7540	$ 0.8322	$ 0.84	$ 0.87	$ 0.89	$ 0.92	$ 0.95	$ 0.98	$ 1.01	$ 1.04	$ 1.07	$ 1.10
Avg. LIFT Boarding Fare	$ 1.0509	$ 1.1239	$ 1.13	$ 1.16	$ 1.20	$ 1.23	$ 1.27	$ 1.31	$ 1.35	$ 1.39	$ 1.43	$ 1.47
Avg. Commuter Rail Fare	$ -	$ 1.5800	$ 1.58	$ 1.63	$ 1.68	$ 1.73	$ 1.78	$ 1.83	$ 1.89	$ 1.94	$ 2.00	$ 2.06
Avg. System Boarding Fare	$ 0.8061	$ 0.8918	$ 0.90	$ 0.93	$ 0.96	$ 0.99	$ 1.02	$ 1.05	$ 1.08	$ 1.11	$ 1.15	$ 1.18
Passenger Revenue Rail	31,398,472	35,896,438	44,476,957	49,069,928	52,164,485	55,455,227	58,954,661	62,676,102	73,789,648	83,251,029	88,434,205	93,944,065
Passenger Revenue Bus	48,242,987	56,001,630	57,760,072	60,356,000	63,340,339	66,756,454	70,352,845	74,138,894	77,714,819	81,889,564	86,284,072	90,909,761
Passenger Revenue LIFT	1,179,156	1,302,656	1,306,147	1,311,134	1,315,386	1,369,667	1,452,338	1,548,518	1,716,848	1,809,026	1,908,016	2,012,422
Passenger Revenue CR	-	331,718	856,005	920,391	989,620	1,064,056	1,144,091	1,230,146	1,322,674	1,422,162	1,529,133	1,644,149
Total	80,820,615	93,532,443	104,399,181	111,657,453	117,809,830	124,645,404	131,903,936	139,593,661	154,543,989	168,371,781	178,155,426	188,510,397
Actual												
Total/1000	80,821	93,532	104,399	111,657	117,810	124,645	131,904	139,594	154,544	168,372	178,155	188,510
Passenger Revenue Increase	4,889,952	12,711,828	10,866,738	7,258,272	6,152,377	6,835,574	7,258,532	7,689,725	14,950,329	13,827,792	9,783,645	10,354,971
Percent Change	6.44%	15.73%	11.62%	6.95%	5.51%	5.80%	5.82%	5.83%	10.71%	8.95%	5.81%	5.81%
Fixed Route Bus Boardings:	63,980,400	67,292,585	68,533,949	69,528,244	70,840,883	72,486,916	74,167,015	75,881,868	77,225,108	79,003,444	80,818,516	82,671,064
Change in Rides:	1.7%	5.2%	1.8%	1.5%	1.9%	2.3%	2.3%	2.3%	1.8%	2.3%	2.3%	2.3%
Rail Boardings (excl. MILW and CF	35,250,800	36,637,961	45,006,378	48,217,336	49,771,518	51,376,812	53,034,939	54,747,678	56,516,871	58,344,423	60,232,305	62,182,556
	3.6%	3.9%	22.8%	7.1%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
LIFT Boardings	1,122,044	1,159,071	1,156,127	1,126,739	1,097,469	1,109,473	1,142,174	1,182,343	1,272,688	1,301,960	1,333,207	1,365,204

Table 3.
Passenger Revenue Forecast

	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30
MAX Boardings Avg. Wkdy											
Blue	97,347	100,267	103,275	106,374	109,565	112,852	116,237	119,725	123,316	127,016	130,826
Red	37,474	38,599	39,756	40,949	42,178	43,443	44,746	46,089	47,471	48,895	50,362
Yellow Interstate	20,688	21,309	21,948	22,606	23,285	23,983	24,703	25,444	26,207	26,993	27,803
Green	37,919	39,492	41,131	42,838	44,616	46,468	48,396	50,404	52,496	54,675	56,944
Yellow Milwaukie	22,973	23,344	23,721	24,104	24,493	24,888	25,290	25,698	26,113	26,534	26,962
Yellow CRC	14,880	15,259	15,647	16,045	16,453	16,872	17,301	17,741	18,192	18,655	19,130
Total MAX Wkdy Boardings	216,401	223,011	229,832	236,871	244,136	251,633	259,372	267,359	275,603	284,113	292,898
Additional Bus Vehicle Hrs	10,320	10,372	10,423	10,476	10,528	10,581	10,633	21,480	21,695	21,912	22,131
Additional Bus Boardings	237,359	238,546	239,738	240,937	242,142	243,352	244,569	494,042	498,982	503,972	509,012
Commuter Rail Ridership	832,546	869,094	907,248	947,076	988,653	1,032,054	1,077,362	1,124,658	1,174,030	1,225,570	1,279,373
Annual MAX Boardings	76,322,897	78,629,019	81,008,031	83,462,326	85,994,377	88,606,743	91,302,069	94,083,090	96,952,634	99,913,627	102,969,093
Annualization											
Annual Bus Boardings	84,561,844	86,491,627	88,461,198	90,471,359	92,522,928	94,616,738	96,753,642	99,182,757	101,665,395	104,202,675	106,795,741
Annual LIFT Boardings	1,399,334	1,434,317	1,470,175	1,508,400	1,547,618	1,580,118	1,613,301	1,647,180	1,683,418	1,720,453	1,758,303
Annual Comm Rail Boardings	832,546	869,094	907,248	947,076	988,653	1,032,054	1,077,362	1,124,658	1,174,030	1,225,570	1,279,373
Total Boardings	163,116,621	167,424,057	171,846,651	176,389,160	181,053,575	185,835,654	190,746,374	196,037,685	201,475,477	207,062,325	212,802,509
Avg. MAX Boarding Fare	$ 1.35	$ 1.39	$ 1.43	$ 1.47	$ 1.52	$ 1.56	$ 1.61	$ 1.66	$ 1.71	$ 1.76	$ 1.81
Avg. Bus Boarding Fare	$ 1.13	$ 1.17	$ 1.20	$ 1.24	$ 1.27	$ 1.31	$ 1.35	$ 1.39	$ 1.43	$ 1.48	$ 1.52
Avg. LIFT Boarding Fare	$ 1.52	$ 1.56	$ 1.61	$ 1.66	$ 1.71	$ 1.76	$ 1.81	$ 1.87	$ 1.92	$ 1.98	$ 2.04
Avg. Commuter Rail Fare	$ 2.12	$ 2.19	$ 2.25	$ 2.32	$ 2.39	$ 2.46	$ 2.54	$ 2.61	$ 2.69	$ 2.77	$ 2.85
Avg. System Boarding Fare	$ 1.22	$ 1.25	$ 1.29	$ 1.33	$ 1.37	$ 1.41	$ 1.45	$ 1.50	$ 1.54	$ 1.59	$ 1.63
Passenger Revenue Rail	99,801,433	106,028,481	112,648,807	119,687,534	127,171,405	135,128,894	143,590,312	152,587,933	162,156,121	172,331,464	183,152,921
Passenger Revenue Bus	95,778,638	100,903,331	106,297,115	111,973,950	117,948,515	124,236,243	130,853,362	138,162,748	145,869,724	153,995,526	162,562,508
Passenger Revenue LIFT	2,124,615	2,243,062	2,368,113	2,502,574	2,644,670	2,781,215	2,924,809	3,075,817	3,237,789	3,408,291	3,587,772
Passenger Revenue CR	1,767,817	1,900,787	2,043,759	2,197,484	2,362,772	2,540,493	2,731,581	2,937,043	3,157,958	3,395,490	3,650,889
Total	199,472,504	211,075,661	223,357,793	236,361,542	250,127,363	264,686,844	280,100,063	296,763,540	314,421,592	333,130,771	352,954,090
Actual											
Total/1000	199,473	211,076	223,358	236,362	250,127	264,687	280,100	296,764	314,422	333,131	352,954
Passenger Revenue Increase	10,962,107	11,603,157	12,282,132	13,003,749	13,765,821	14,559,481	15,413,219	16,663,477	17,658,052	18,709,178	19,823,319
Percent Change	5.82%	5.82%	5.82%	5.82%	5.82%	5.82%	5.82%	5.95%	5.95%	5.95%	5.95%
Fixed Route Bus Boardings:	84,561,844	86,491,627	88,461,198	90,471,359	92,522,928	94,616,738	96,753,642	99,182,757	101,665,395	104,202,675	106,795,741
Change in Rides:	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.5%	2.5%	2.5%	2.5%
Rail Boardings (excl. MILW and CF	64,197,286	66,278,679	68,428,993	70,650,567	72,945,820	75,317,254	77,767,462	80,299,124	82,915,016	85,618,009	88,411,075
	3.2%	3.2%	3.2%	3.2%	3.2%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%
LIFT Boardings	1,399,334	1,434,317	1,470,175	1,508,400	1,547,618	1,580,118	1,613,301	1,647,180	1,683,418	1,720,453	1,758,303

Table 4. Operating Grants, Operating Revenues, Accessible Transportation Program Revenues

	Operating Grants and Capital Reimbursement Forecast	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018
1	RTO, Vanpools	462,774	374,000	385,220	396,777	408,680	420,940	433,569	446,576	459,973	473,772	487,985
2	Section 5307	$31,419,385	$33,417,193	$34,419,708	$35,452,300	$36,515,869	$37,611,345	$38,739,685	$39,901,875	$41,098,932	$42,331,900	$43,601,857
3	Section 5309 FG	$ 9,383,075	$ 9,758,398	$ 10,734,238	$ 11,163,607	$ 11,721,788	$ 13,245,620	$ 13,775,445	$ 14,326,463	$ 14,899,521	$ 16,995,502	$ 19,175,322
4	CMAQ/STP for 2005 GARVEE Bonds	$12,990,708	$9,300,000	$9,300,000	$9,300,000	$9,300,000	$9,300,000	$9,300,000	$9,300,000			
5	CMAQ//STP for 2011 GARVEE Bonds				$0	$3,700,000	$3,700,000	$3,700,000	$3,700,000	13,000,000	13,000,000	13,000,000
6	Funding Exchanges	$2,375,000	$450,000									
7	Commuter Rail Startup	0	0									
8	Project Reimbursement to General Fund	3,307,093	2,845,000	1,924,000	974,000	974,000	974,000	974,000	974,000	974,000		
9	Jobs Access	344,775	608,000	626,240	645,027	664,378	684,309	704,839	725,984	747,763	770,196	793,302
10	Homeland Security	160,055	97,000	422,000	97,000							
11	New Freedom	198,969	506,749	430,291	400,000	393,047	404,838	416,984	429,493	442,378	455,649	469,319
12	LEP	63,301	139,269	139,269								
13	STF Discretionary RideWise, PM	927,503	433,762	446,775	460,178	473,983	488,203	502,849	517,935	533,473	549,477	565,961
14	Total Rounded to Nearest 1000s	$61,633	$57,929	$58,828	$58,889	$64,152	$66,829	$68,547	$70,322	$72,156	$74,576	$78,094
	Operating Revenue Forecast	**FY2008**	**FY2009**	**FY2010**	**FY2011**	**FY2012**	**FY2013**	**FY2014**	**FY2015**	**FY2016**	**FY2017**	**FY2018**
15	CTRAN	275,000	137,500	137,500	141,625	145,874	150,250	154,757	159,400	164,182	169,108	174,181
16	MTP	19,021,512	16,863,059	17,453,266	18,064,130	18,696,375	19,350,748	20,028,024	20,729,005	21,454,520	22,205,428	22,982,618
17	Bus/ LR Advertising	$4,268,250	$4,527,250	$4,818,500	$5,090,750	$5,388,750	$5,674,500	$5,844,735	$6,020,077	$6,200,679	$6,386,700	$6,578,301
18	Fiber Optic Lease Revenue	$257,683	$257,683	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000
19	Concessions	$9,125	$9,399	$9,681	$9,971	$10,270	$10,578	$10,896	$11,223	$11,559	$11,906	$12,263
20	Wilsonville Contribution WCCR		$125,000	$300,000	$300,000	$300,000	$300,000	$309,000	$318,270	$327,818	$337,653	$347,782
21	Washington County Contribution WCCR	$0	$990,099	$2,000,000	$ 2,000,000	1,009,901	-	$0	$0	$0	$0	$0
22	City of Portland PMMI Reimbursement	$500,000	$490,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000
23	Lloyd Center Bus Stop Improvements	$55,000	$20,000									
24	Metro, Gresham Civic Station	$0										
25	Medicare Drug Reimbursement	$262,112	$269,975	$278,075	$286,417	$295,009	$303,860	$312,975	$322,365	$332,036	$341,997	$352,257
26	Streetcar Personnel Revenue	$3,505,066	$3,059,962	$3,197,660	$3,341,555	$3,491,925	$3,649,062	$3,813,270	$3,984,867	$4,164,186	$4,351,574	$4,547,395
27	Miscellaneous	2,100,352	$2,500,000	$2,587,500	$2,678,063	$2,771,795	$2,868,808	$2,969,216	$3,073,138	$3,180,698	$3,292,023	$3,407,243
28	Total Rounded to Nearest 1000s	$30,254	$29,250	$31,582	$32,713	$32,910	$33,108	$34,243	$35,418	$36,636	$37,896	$39,202
	ATP Revenue Forecast	**FY2008**	**FY2009**	**FY2010**	**FY2011**	**FY2012**	**FY2013**	**FY2014**	**FY2015**	**FY2016**	**FY2017**	**FY2018**
29	ATP Operating Revenue											
30	Agency Contracts	$2,376,691	$2,370,782	$2,477,467	$2,588,953	$2,705,456	$2,827,202	$2,954,426	$3,087,375	$3,226,307	$3,371,491	$3,523,208
31	STF Formula	$846,647	$829,714	$813,120	$796,857	$780,920	$765,302	$749,996	$734,996	$720,296	$705,890	$691,772
32	Total Rounded to Nearest 1000s	$3,223	$3,200	$3,291	$3,386	$3,486	$3,593	$3,704	$3,822	$3,947	$4,077	$4,215

Table 4. Operating Grants, Operating Revenues, Accessible Transportation Program Revenues

Operating Grants and Capital Reimbursement Forecast	**FY2019**	**FY2020**	**FY2021**	**FY2022**	**FY2023**	**FY2024**	**FY2025**	**FY2026**	**FY2027**	**FY2028**	**FY2029**	**FY2030**
RTO, Vanpools	502,625	517,703	533,235	549,232	565,709	582,680	600,160	618,165	636,710	655,811	675,486	695,750
Section 5307	$44,909,912	$46,257,210	$47,644,926	$49,074,274	$50,546,502	$52,062,897	$53,624,784	$55,233,528	$56,890,533	$58,597,249	$60,355,167	$62,165,822
Section 5309 FG	$ 19,942,335	$ 20,740,028	$ 21,569,630	$ 22,432,415	$ 24,829,711	$ 25,822,900	$ 26,855,816	$ 27,930,048	$ 29,047,250	$ 30,209,140	$ 31,417,506	$ 32,674,206
CMAQ/STP for 2005 GARVEE Bonds												
CMAQ//STP for 2011 GARVEE Bonds	13,000,000	13,000,000	13,000,000	13,000,000	13,000,000	13,000,000	13,000,000	13,000,000	-	-	-	-
Funding Exchanges												
Commuter Rail Startup												
Project Reimbursement to General Fund												
Jobs Access	817,101	841,614	866,863	892,868	919,655	947,244	975,662	1,004,931	1,035,079	1,066,132	1,098,116	1,131,059
Homeland Security												
New Freedom	483,398	497,900	512,837	528,222	544,069	560,391	577,203	594,519	612,354	630,725	649,647	669,136
LEP												
STF Discretionary RideWise, PM	582,940	600,428	618,441	636,994	656,104	675,787	696,061	716,942	738,451	760,604	783,422	806,925
Total Rounded to Nearest 1000s	$80,238	$82,455	$84,746	$87,114	$91,062	$93,652	$96,330	$99,098	$88,960	$91,920	$94,979	$98,143

Operating Revenue Forecast	**FY2019**	**FY2020**	**FY2021**	**FY2022**	**FY2023**	**FY2024**	**FY2025**	**FY2026**	**FY2027**	**FY2028**	**FY2029**	**FY2030**
CTRAN	179,406	184,789	190,332	196,042	201,923	207,981	214,221	220,647	227,267	234,085	241,107	248,340
MTP	23,787,010	24,619,555	25,481,240	26,373,083	27,296,141	28,251,506	29,240,308	30,263,719	31,322,949	32,419,253	33,553,926	34,728,314
Bus/ LR Advertising	$6,775,650	$6,978,919	$7,188,287	$7,403,935	$7,626,053	$7,854,835	$8,090,480	$8,333,195	$8,583,190	$8,840,686	$9,105,907	$9,379,084
Fiber Optic Lease Revenue	$300,000	$300,000										
Concessions	$12,631	$13,010	$13,400	$13,802	$14,216	$14,643	$15,082	$15,535	$16,001	$16,481	$16,975	$17,484
Wilsonville Contribution WCCR	$358,216	$368,962	$380,031	$391,432	$403,175	$415,270	$427,728	$440,560	$453,777	$467,390	$481,412	$495,854
Washington County Contribution WCCR	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
City of Portland PMMI Reimbursement	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000
Lloyd Center Bus Stop Improvements												
Metro, Gresham Civic Station												
Medicare Drug Reimbursement	$362,824	$373,709	$384,920	$396,468	$408,362	$420,613	$433,231	$446,228	$459,615	$473,403	$487,606	$502,234
Streetcar Personnel Revenue	$4,752,028	$4,965,869	$5,189,333	$5,422,853	$5,666,881	$5,921,891	$6,188,376	$6,466,853	$6,757,861	$7,061,965	$7,379,754	$7,711,842
Miscellaneous	$3,526,497	$3,649,924	$3,777,672	$3,909,890	$4,046,736	$4,188,372	$4,334,965	$4,486,689	$4,643,723	$4,806,253	$4,974,472	$5,148,579
Total Rounded to Nearest 1000s	$40,554	$41,955	$43,105	$44,608	$46,163	$47,775	$49,444	$51,173	$52,964	$54,820	$56,741	$58,732

ATP Revenue Forecast	**FY2019**	**FY2020**	**FY2021**	**FY2022**	**FY2023**	**FY2024**	**FY2025**	**FY2026**	**FY2027**	**FY2028**	**FY2029**	**FY2030**
ATP Operating Revenue												
Agency Contracts	$3,681,752	$3,847,431	$4,020,565	$4,201,491	$4,390,558	$4,588,133	$4,794,599	$5,010,356	$5,235,822	$5,471,434	$5,717,648	$5,974,943
STF Formula	$677,937	$664,378	$651,090	$638,069	$625,307	$612,801	$600,545	$588,534	$576,764	$565,228	$553,924	$542,845
Total Rounded to Nearest 1000s	$4,360	$4,512	$4,672	$4,840	$5,016	$5,201	$5,395	$5,599	$5,813	$6,037	$6,272	$6,518

Table 5. Capital Improvement Forecast Federal and State Funds

	000 YOEs	**FY07**	**FY08**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14**	**FY15**	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**
1	State Mass Transit Program	-	-	1,468	625	625	625	625	625	625	625	625	625	625	625
2	State Special Transportation Grant Funds for LIFT Vehicles	2,578	3,342	1,029	800	-	1,000	-	1,000	-	1,000	-	1,000	-	1,000
3	CMAQ funds for LIFT vehicles			1,822											
4	Transit Enhancement (in Operating Revenue)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Washington County Share of Commuter Rail Overruns			3,438	3,754	4,099	4,477								
6	Homeland Security	1,064	862	1,301	761	-	-								
7	Bus Stops/Streamline	238	1,576	1,534	1,375	1,375	1,416	1,459	1,502	1,548	1,594	1,642	1,691	1,742	1,794
8	Washco Bus Stops			231											
9	Weststart/Calstart Hybrid Vehicle			135											
10	City Share of Steel Bridge			993											
11	Capital Lease Revenue Millikan Park Ride			750											
12	Milwaukie Park and Ride	114	-	299	-	-									
13	Gateway TOD	138	-	-	-	-	-	-	-	-	-	-	-	-	-
14	Gresham Civic Station		-	200	1,144	395									
15	BETC for Electronic Cooling System			-											
16	Continuously Regenerating Traps-CMAQ	-	-	1,000											
17	Hybrid Cutaway Vehicle Innovation Grant			150											
18	Rockwood-Connect Oregon 2 and Gresham			4,900											
19	**Total**	4,132	5,779	19,249	8,458	6,494	7,518	2,084	3,127	2,173	3,219	2,267	3,316	2,367	3,419

Table 5. Capital Improvement Forecast Federal and State Funds

000 YOEs	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30
State Mass Transit Program	625	625	625	625	625	625	625	625	625	625
State Special Transportation Grant Funds for LIFT Vehicles	-	1,000	-	1,000	-	1,000	-	1,000	-	1,000
CMAQ funds for LIFT vehicles										
Transit Enhancement (in Operating Revenue)	-	-	-	-	-	-	-	-	-	-
Washington County Share of Commuter Rail Overruns										
Homeland Security										
Bus Stops/Streamline	1,848	1,903	1,960	2,019	2,080	2,142	2,206	2,273	2,341	2,411
Washco Bus Stops										
Weststart/Calstart Hybrid Vehicle										
City Share of Steel Bridge										
Capital Lease Revenue Millikan Park Ride										
Milwaukie Park and Ride										
Gateway TOD	-	-	-	-	-	-	-	-	-	-
Gresham Civic Station										
BETC for Electronic Cooling System										
Continuously Regenerating Traps-CMAQ										
Hybrid Cutaway Vehicle Innovation Grant										
Rockwood-Connect Oregon 2 and Gresham										
Total	2,473	3,528	2,585	3,644	2,705	3,767	2,831	3,898	2,966	4,036

Table 6. Materials and Services Inflation

Materials and Services Forecast	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017
General and Administration	35,737,997	38,416,114	40,945,482	44,851,050	49,244,476	54,170,833	59,611,072	65,627,843	72,213,004
Subtract Retiree/Disabled Medical	13,660,561	15,897,129	17,750,927	20,960,659	24,637,373	28,825,517	33,505,397	38,738,998	44,517,493
General and Admin. CPI Adjusted M and S	22,077,436	22,518,985	23,194,555	23,890,391	24,607,103	25,345,316	26,105,676	26,888,846	27,695,511
General and Admin. M and S Increase		2,678,117	2,529,368	3,905,568	4,393,426	4,926,357	5,440,239	6,016,771	6,585,161
Retiree Medical Base Costs	13,660,561	14,890,011	16,622,067	19,537,309	23,070,958	27,116,775	31,725,156	36,873,739	42,631,550
Retiree Medical Inflation		1,229,450	1,732,056	2,915,241	3,533,649	4,045,816	4,608,382	5,148,582	5,757,811
Additional Retirees	-	93	94	107	106	104	98	92	84
Retiree Medical Cost per Member	$ 9,725	$ 10,795	$ 11,982	$ 13,300	$ 14,763	$ 16,387	$ 18,190	$ 20,191	$ 22,412
Additional Dependents			-	-	-	-	-	-	-
Cost per Dependent			$ 3,600	$ 3,996	$ 4,436	$ 4,923	$ 5,465	$ 6,066	$ 6,733
Cost for Additional Retiree Members		1,007,117	1,128,860	1,423,350	1,566,415	1,708,743	1,780,240	1,865,259	1,885,943
Total Retiree-Medical Costs	13,660,561	15,897,129	17,750,927	20,960,659	24,637,373	28,825,517	33,505,397	38,738,998	44,517,493
		1.16	1.12	1.18	1.18	1.17	1.16	1.16	1.15
Retiree-Medical Increase		2,236,568	1,853,798	3,209,731	3,676,714	4,188,144	4,679,879	5,233,601	5,778,495
							3,307,473		
Bus Operations	36,836,604	36,056,854	37,707,767	39,442,360	41,265,192	43,181,083	45,195,127	47,312,708	49,539,521
Bus Operations Fuel Costs	20,250,902	18,973,581	20,111,996	21,318,715	22,597,838	23,953,708	25,390,931	26,914,387	28,529,250
Bus Operations CPI Adjusted M and S	16,585,702	17,083,273	17,595,771	18,123,644	18,667,354	19,227,374	19,804,196	20,398,321	21,010,271
Bus Operations M and S Increase		(779,750)	1,650,913	1,734,593	1,822,832	1,915,891	2,014,044	2,117,582	2,226,813
Rail Operations	9,653,491	10,368,030	10,919,335	11,424,304	11,956,839	12,518,636	13,111,504	13,737,369	14,398,287
Rail Operations Propulsion	3,541,115	4,072,282	4,434,715	4,745,145	5,077,306	5,432,717	5,813,007	6,219,918	6,655,312
Rail Operations CPI Adjusted M and S	6,112,376	6,295,747	6,484,620	6,679,158	6,879,533	7,085,919	7,298,497	7,517,451	7,742,975
Rail Operations M and S Increase		714,539	551,306	504,969	532,535	561,797	592,868	625,865	660,918
Field Operations CPI Adjusted M and S	268,032	276,073	284,355	292,886	301,672	310,723	320,044	329,646	339,535
Field Operations M and S Increase	-	8,041	8,282	8,531	8,787	9,050	9,322	9,601	9,889
Capital Projects and Facilities	8,185,825	8,342,586	8,948,119	9,352,743	9,779,039	10,228,324	10,702,002	11,201,568	11,728,616
Capital Projects Utilities	2,960,459	3,404,528	3,642,845	3,897,844	4,170,694	4,462,642	4,775,027	5,109,279	5,466,928
Capital Projects CPI Adjusted M and S	5,225,366	5,382,127	5,543,590	5,709,898	5,881,195	6,057,631	6,239,360	6,426,541	6,619,337
Capital Project and Facilities M and S increase		156,761	605,533	404,625	426,296	449,285	473,677	499,566	527,048
Total M and S to Check Against Budget	147,436,106								
Total M and S Increase		2,777,707	5,345,402	6,558,285	7,183,876	7,862,381	8,530,149	9,269,386	10,009,829
Total M and S to increase services	77,021,388	77,562,527	81,054,130	84,402,684	87,909,845	91,584,082	95,434,352	99,470,137	103,701,470
PS	240,253,877	250,283,141	261,079,078	272,665,520	282,102,233	295,411,329	308,608,901	322,540,139	337,407,205
Total PS and M and S	317,275,266	327,845,668	342,133,209	357,068,204	370,012,078	386,995,411	404,043,254	422,010,275	441,108,675
Weighted Average Inflation (for new services only)		1.033316189	1.043580079	1.043652575	1.036250425	1.045899401	1.044051796	1.044468065	1.04525577

Table 6. Materials and Services Inflation

Materials and Services Forecast

	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026
General and Administration	79,721,647	88,067,964	97,084,346	107,186,315	118,234,905	131,976,771	147,305,925	162,577,966	179,607,439
Subtract Retiree/Disabled Medical	51,195,270	58,685,797	66,820,713	76,014,773	86,128,217	98,906,882	113,243,940	127,494,121	143,471,079
General and Admin. CPI Adjusted M and S	28,526,377	29,382,168	30,263,633	31,171,542	32,106,688	33,069,889	34,061,985	35,083,845	36,136,360
General and Admin. M and S Increase	7,508,642	8,346,318	9,016,381	10,101,969	11,048,590	13,741,866	15,329,154	15,272,041	17,029,473
Retiree Medical Base Costs	48,988,102	56,336,869	64,577,866	73,525,213	83,641,146	94,765,909	108,838,980	124,612,383	140,272,350
Retiree Medical Inflation	6,356,552	7,348,767	8,240,997	8,947,347	10,115,933	11,124,763	14,073,071	15,773,403	15,659,967
Additional Retirees	89	85	73	73	66	99	95	56	56
Retiree Medical Cost per Member	$ 24,877	$ 27,614	$ 30,651	$ 34,023	$ 37,765	$ 41,919	$ 46,531	$ 51,649	$ 57,330
Additional Dependents	-	-	-	-	-	-	-	-	-
Cost per Dependent	$ 7,474	$ 8,296	$ 9,209	$ 10,222	$ 11,346	$ 12,594	$ 13,980	$ 15,518	$ 17,225
Cost for Additional Retiree Members	2,207,168	2,348,928	2,242,847	2,489,560	2,487,071	4,140,973	4,404,960	2,881,738	3,198,729
Total Retiree-Medical Costs	51,195,270	58,685,797	66,820,713	76,014,773	86,128,217	98,906,882	113,243,940	127,494,121	143,471,079
	1.15	1.15	1.14	1.14	1.13	1.15	1.14	1.13	1.13
Retiree-Medical Increase	6,677,777	7,490,526	8,134,916	9,194,060	10,113,444	12,778,665	14,337,058	14,250,181	15,976,958
			6,332,533						
Bus Operations	51,881,584	54,345,262	56,937,284	59,664,766	62,535,235	65,556,649	68,737,427	72,086,473	75,613,206
Bus Operations Fuel Costs	30,241,005	32,055,465	33,978,793	36,017,521	38,178,572	40,469,286	42,897,444	45,471,290	48,199,568
Bus Operations CPI Adjusted M and S	21,640,579	22,289,797	22,958,491	23,647,245	24,356,663	25,087,363	25,839,983	26,615,183	27,413,638
Bus Operations M and S Increase	2,342,063	2,463,678	2,592,022	2,727,482	2,870,469	3,021,414	3,180,778	3,349,046	3,526,733
Rail Operations	15,096,448	15,834,189	16,614,001	17,438,543	18,310,650	19,233,346	20,209,859	21,243,634	22,338,346
Rail Operations Propulsion	7,121,184	7,619,667	8,153,043	8,723,756	9,334,419	9,987,829	10,686,977	11,435,065	12,235,520
Rail Operations CPI Adjusted M and S	7,975,264	8,214,522	8,460,958	8,714,787	8,976,230	9,245,517	9,522,883	9,808,569	10,102,826
Rail Operations M and S Increase	698,161	737,741	779,812	824,542	872,107	922,696	976,514	1,033,775	1,094,712
Field Operations CPI Adjusted M and S	349,721	360,213	371,019	382,150	393,614	405,422	417,585	430,113	443,016
Field Operations M and S Increase	10,186	10,492	10,806	11,131	11,464	11,808	12,163	12,528	12,903
Capital Projects and Facilities	12,284,845	12,872,068	13,492,214	14,147,344	14,839,654	15,571,484	16,345,335	17,163,870	18,029,934
Capital Projects Utilities	5,849,613	6,259,086	6,697,222	7,166,028	7,667,650	8,204,386	8,778,693	9,393,201	10,050,725
Capital Projects CPI Adjusted M and S	6,817,917	7,022,454	7,233,128	7,450,122	7,673,626	7,903,834	8,140,949	8,385,178	8,636,733
Capital Project and Facilities M and S increase	556,230	587,223	620,147	655,130	692,309	731,831	773,851	818,535	866,064
Total M and S to Check Against Budget									
Total M and S Increase	11,115,282	12,145,450	13,019,168	14,320,254	15,494,939	18,429,616	20,272,459	20,485,925	22,529,885
Total M and S to increase services	108,138,975	112,793,899	117,678,151	122,804,345	128,185,840	133,836,790	139,772,192	146,007,935	152,560,862
PS	353,288,816	370,271,071	388,448,177	407,923,239	428,809,138	451,229,486	475,319,683	501,228,076	529,117,234
Total PS and M and S	461,427,791	483,064,970	506,126,328	530,727,584	556,994,978	585,066,277	615,091,875	647,236,011	681,678,096
Weighted Average Inflation (for new services only)	1.046063742	1.046891799	1.047739661	1.048606948	1.049493177	1.050397758	1.051319995	1.052259081	1.053214105

Table 6. Materials and Services Inflation

Materials and Services Forecast

	FY2027	FY2028	FY2029	FY2030	
General and Administration	198,621,214	219,854,563	243,570,517	270,063,109	
Subtract Retiree/Disabled Medical	161,400,763	181,517,499	204,083,341	229,391,317	
General and Admin. CPI Adjusted M and S	37,220,451	38,337,065	39,487,177	40,671,792	
General and Admin. M and S Increase	19,013,775	21,233,349	23,715,954	26,492,591	
Retiree Medical Base Costs	157,850,174	177,576,345	199,708,660	224,535,421	
Retiree Medical Inflation	17,577,824	19,726,171	22,132,315	24,826,761	
Additional Retirees	56	56	56	56	1693.505333
Retiree Medical Cost per Member	$ 63,637	$ 70,637	$ 78,407	$ 87,032	
Additional Dependents	-	-	-	-	
Cost per Dependent	$ 19,119	$ 21,222	$ 23,557	$ 26,148	
Cost for Additional Retiree Members	3,550,589	3,941,154	4,374,680	4,855,895	
Total Retiree-Medical Costs	161,400,763	181,517,499	204,083,341	229,391,317	
	1.12	1.12	1.12	1.12	
Retiree-Medical Increase	17,929,684	20,116,736	22,565,842	25,307,976	
Bus Operations	79,327,589	83,240,163	87,362,079	91,705,135	
Bus Operations Fuel Costs	51,091,542	54,157,034	57,406,456	60,850,844	
Bus Operations CPI Adjusted M and S	28,236,048	29,083,129	29,955,623	30,854,292	
Bus Operations M and S Increase	3,714,383	3,912,574	4,121,916	4,343,056	
Rail Operations	23,497,917	24,726,535	26,028,669	27,409,090	
Rail Operations Propulsion	13,092,006	14,008,446	14,989,038	16,038,270	
Rail Operations CPI Adjusted M and S	10,405,911	10,718,088	11,039,631	11,370,820	
Rail Operations M and S Increase	1,159,571	1,228,618	1,302,134	1,380,422	
Field Operations CPI Adjusted M and S	456,307	469,996	484,096	498,618	
Field Operations M and S Increase	13,290	13,689	14,100	14,523	
Capital Projects and Facilities	18,946,560	19,916,986	20,944,667	22,033,290	
Capital Projects Utilities	10,754,276	11,507,075	12,312,570	13,174,450	
Capital Projects CPI Adjusted M and S	8,895,835	9,162,710	9,437,592	9,720,719	
Capital Project and Facilities M and S increase	916,626	970,426	1,027,681	1,088,623	
Total M and S to Check Against Budget					
Total M and S Increase	24,817,646	27,358,656	30,181,784	33,319,215	
Total M and S to increase services	159,448,824	166,690,744	174,306,687	182,317,925	
PS	540,261,350	572,663,784	607,634,754	645,099,199	
Total PS and M and S	699,710,174	739,354,528	781,941,441	827,417,124	
Weighted Average Inflation (for new services only)	1.026452483	1.05665825	1.057600124	1.058157403	1.046729944

Labor Cost Forecast

	FY2009	% Change	FY2010	% Change	FY2011	% Change	FY2012	% Change	FY2013	% Change	FY2014	% Change	FY2015	% Change	FY2016
Union Wage/Salaries	109,907,313	0.036	113,863,976	0.03126	117,423,364	0.03126	121,094,019	0.03126	124,879,418	0.03126	128,783,148	0.03126	132,808,910	0.03126	136,960,516
Union Overtime/Other	13,330,700	0.036	13,810,605	0.03126	14,242,324	0.03126	14,687,540	0.03126	15,146,672	0.03126	15,620,157	0.03126	16,108,443	0.03126	16,611,993
Union Other (non-CPI adj)	1,932,114	0.036	2,001,670	0.03126	2,064,242	0.03126	2,128,770	0.03126	2,195,316	0.03126	2,263,941	0.03126	2,334,712	0.03126	2,407,695
Unemployment	103,024	0.036	106,733	0.03126	110,069	0.03126	113,510	0.03126	117,058	0.03126	120,717	0.03126	124,491	0.03126	128,382
Management Wage/Salaries	25,293,522	0.05	26,558,198	0.05	27,886,108	0.05	29,280,413	0.05	30,744,434	0.05	32,281,656	0.05	33,895,739	0.05	35,590,525
Limited Employment	316,820	0.03	326,325	0.03	336,114	0.03	346,198	0.03	356,584	0.03	367,281	0.03	378,300	0.03	389,649
Agency Health/Dental	38,299,791	0.07	40,980,776	0.12	43,166,652	0.12	48,346,650	0.12	54,148,248	0.12	60,646,038	0.10	66,710,642	0.10	73,381,706
Agency Social Security	11,417,771	0.037	11,840,229	0.03296	12,230,483	0.03296	12,633,599	0.03296	13,050,003	0.03296	13,480,131	0.03296	13,924,436	0.03296	14,383,385
Agency Pension	36,777,870	NA	41,315,563	NA	40,547,966	NA	41,156,639	NA	42,839,377	NA	43,593,817	NA	42,851,044	NA	42,078,077
Agency Sick/Life/Payroll Tax/Vacation	2,547,831	0.036	2,639,553	0.03126	2,722,065	0.03126	2,807,157	0.03126	2,894,909	0.03126	2,985,404	0.03126	3,078,727	0.03126	3,174,968
Worker's Compensation	4,120,028	0.04	4,284,829	0.04	4,456,222	0.04	4,634,471	0.04	4,819,850	0.04	5,012,644	0.04	5,213,150	0.04	5,421,676
Extra Day	-	0.03126	-	0.03126		0.03126	-	0.03126		0.03126	-	0.03126	-	0.03126	-
Total	244,046,783		257,728,457		265,185,611		277,228,966		291,191,868		305,154,934		317,428,593		330,528,574
Change			13,682		7,457		12,043		13,963		13,963		12,274		13,100
Percent Change			5.6%		2.9%		4.5%		5.0%		4.8%		4.0%		4.1%
	2009		2010		2011		2012		2013		2014		2015		2016
TOTAL EXPENDITURES	404,916,004		437,554,733		458,056,982		491,296,002		518,704,512		549,006,923		579,432,781		619,742,024
Pension Costs as a Percent of Total Exp	9.1%		9.4%		8.9%		8.4%		8.3%		7.9%		7.4%		6.8%
Health Costs as a Percent of Total Exp	9.5%		9.4%		9.4%		9.8%		10.4%		11.0%		11.5%		11.8%
Fringe Inflation	89,043,263		96,776,121		98,667,166		104,944,045		112,932,537		120,705,389		126,564,849		133,018,137
			8.7%		2.0%		6.4%		7.6%		6.9%		4.9%		5.1%

Pension Forecast

	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016
Management DB Plan								
Normal Cost	5,645,296	5,427,011	5,172,785	4,879,568	4,544,098	4,162,881	3,765,807	3,318,617
Minimum Funding of Unfunded Actuarial Liability	1,927,468	1,927,468	1,927,468	1,927,468	1,927,468	1,927,468	1,927,468	1,927,468
Total DB Plan	7,572,764	7,354,479	7,100,253	6,807,036	6,471,566	6,090,349	5,693,275	5,246,085
DC Plan	1,153,636	1,361,084	1,547,713	1,749,603	1,967,812	2,203,467	2,457,769	2,731,992
Union Plan								
Normal Cost	10,625,743	10,600,000	10,600,000	10,600,000	10,600,000	10,600,000	10,600,000	10,600,000
20 Year Amortization of UAAL	17,425,727	22,000,000	21,300,000	22,000,000	23,800,000	24,700,000	24,100,000	23,500,000
Total Union Plan	28,051,470	32,600,000	31,900,000	32,600,000	34,400,000	35,300,000	34,700,000	34,100,000
Additional Union Employees								
Total Pension Costs (w/LR Construction Fund)	36,777,870	41,315,563	40,547,966	41,156,639				
DB Plan Average Payroll per Participant	79,299	83,264	87,427	91,799	96,388	101,208	106,268	111,582
DB Participants	225	206	187	168	149	130	112	94
Payroll of DB Participants	17,842,275	17,152,374	16,348,877	15,422,149	14,361,876	13,157,021	11,902,043	10,488,676
DC Plan Average Payroll per Participant	70,757	74,295	78,010	81,910	86,006	90,306	94,821	99,562
DC Participants Total	210	229	248	267	286	305	324	343
DC Plan Contribution	1,188,720	1,361,084	1,547,713	1,749,603	1,967,812	2,203,467	2,457,769	2,731,992

Labor Cost Forecast

	% Change	**FY2017**	% Change	**FY2018**	% Change	FY2019	% Change	FY2020	% Change	FY2021	% Change	FY2022	% Change	FY2023
Union Wage/Salaries	0.03126	141,241,902	0.03126	145,657,124	0.03126	150,210,365	0.03126	154,905,941	0.03126	159,748,301	0.03126	164,742,033	0.03126	169,891,869
Union Overtime/Other	0.03126	17,131,284	0.03126	17,666,808	0.03126	18,219,072	0.03126	18,788,600	0.03126	19,375,932	0.03126	19,981,624	0.03126	20,606,249
Union Other (non-CPI adj)	0.03126	2,482,960	0.03126	2,560,577	0.03126	2,640,621	0.03126	2,723,166	0.03126	2,808,293	0.03126	2,896,080	0.03126	2,986,611
Unemployment	0.03126	132,396	0.03126	136,534	0.03126	140,802	0.03126	145,204	0.03126	149,743	0.03126	154,424	0.03126	159,251
Management Wage/Salaries	0.05	37,370,052	0.05	39,238,554	0.05	41,200,482	0.05	43,260,506	0.05	45,423,531	0.05	47,694,708	0.05	50,079,443
Limited Employment	0.03	401,338	0.03	413,378	0.03	425,780	0.03	438,553	0.03	451,710	0.03	465,261	0.03	479,219
Agency Health/Dental	0.10	80,719,877	0.10	88,791,864	0.10	97,671,051	0.10	107,438,156	0.10	118,181,972	0.10	130,000,169	0.10	143,000,186
Agency Social Security	0.03296	14,857,462	0.03296	15,347,164	0.03296	15,853,006	0.03296	16,375,521	0.03296	16,915,259	0.03296	17,472,785	0.03296	18,048,688
Agency Pension	NA	41,272,256	NA	40,430,725	NA	40,150,430	NA	39,828,096	NA	39,460,223	NA	39,502,615	NA	39,736,372
Agency Sick/Life/Payroll Tax/Vacation	0.03126	3,274,218	0.03126	3,376,570	0.03126	3,482,122	0.03126	3,590,973	0.03126	3,703,226	0.03126	3,818,989	0.03126	3,938,371
Worker's Compensation	0.04	5,638,543	0.04	5,864,085	0.04	6,098,648	0.04	6,342,594	0.04	6,596,298	0.04	6,860,149	0.04	7,134,555
Extra Day	0.03126	-	0.03126	-	0.03126	-	0.03126	-	0.03126	-	0.03126	-	0.03126	-
Total		344,522,286		359,483,383		376,092,379		393,837,312		412,814,487		433,588,838		456,060,816
Change		13,994		14,961		16,609		17,745		18,977		20,774		22,472
Percent Change		4.2%		4.3%		4.6%		4.7%		4.8%		5.0%		5.2%
		2017		2018		2019		2020		2021		2022		2023
TOTAL EXPENDITURES		653,900,099		689,985,260		728,931,987		768,532,682		818,694,609		872,241,415		927,111,049
Pension Costs as a Percent of Total Exp		6.3%		5.9%		5.5%		5.2%		4.8%		4.5%		4.3%
Health Costs as a Percent of Total Exp		12.3%		12.9%		13.4%		14.0%		14.4%		14.9%		15.4%
Fringe Inflation		140,123,812		147,946,323		157,156,608		167,232,746		178,260,679		190,794,559		204,723,617
		5.3%		5.6%		6.2%		6.4%		6.6%		7.0%		7.3%
Pension Forecast														
Management DB Plan														
Normal Cost		2,817,294		2,257,542		1,634,772		944,081		180,234				
Minimum Funding of Unfunded Actuarial Liability		1,927,468		1,927,468		1,927,468		1,927,468		1,927,468		1,927,468		1,927,468
Total DB Plan		4,744,762		4,185,010		3,562,240		2,871,549		2,107,702		1,927,468		1,927,468
DC Plan		3,027,494		3,345,715		3,688,190		4,056,548		4,452,521		4,675,147		4,908,904
Union Plan														
Normal Cost		10,600,000		10,600,000		10,600,000		10,600,000		10,600,000		10,600,000		10,600,000
20 Year Amortization of UAAL		22,900,000		22,300,000		22,300,000		22,300,000		22,300,000		22,300,000		22,300,000
Total Union Plan		33,500,000		32,900,000		32,900,000		32,900,000		32,900,000		32,900,000		32,900,000
Additional Union Employees														
Total Pension Costs (w/LR Construction Fund)														
DB Plan Average Payroll per Participant		117,161		123,019		129,170		135,628		142,410				
DB Participants		76		58		40		22		4				
Payroll of DB Participants		8,904,216		7,135,089		5,166,789		2,983,820		569,638				
DC Plan Average Payroll per Participant		104,541		109,768		115,256		121,019		127,070		133,423		140,094
DC Participants Total		362		381		400		419		438		438		438
DC Plan Contribution		3,027,494		3,345,715		3,688,190		4,056,548		4,452,521		4,675,147		4,908,904

Table 7 Labor Costs-20%20Yrs FY09-FY30

Labor Cost Forecast

	% Change	FY2024	% Change	FY2025	% Change	FY2026	Change	FY2027	% Change	FY2028		FY2029		FY2030
Union Wage/Salaries	0.03126	175,202,689	0.03126	180,679,525	0.03126	186,327,567	0.0313	192,152,167	0.03126	198,158,843	0.03126	204,353,289	0.03126	210,741,372
Union Overtime/Other	0.03126	21,250,401	0.03126	21,914,688	0.03126	22,599,741	0.0313	23,306,209	0.03126	24,034,761	0.03126	24,786,088	0.03126	25,560,901
Union Other (non-CPI adj)	0.03126	3,079,973	0.03126	3,176,253	0.03126	3,275,542	0.0313	3,377,936	0.03126	3,483,530	0.03126	3,592,425	0.03126	3,704,725
Unemployment	0.03126	164,229	0.03126	169,363	0.03126	174,658	0.0313	180,117	0.03126	185,748	0.03126	191,554	0.03126	197,542
Management Wage/Salaries	0.05	52,583,416	0.05	55,212,586	0.05	57,973,216	0.05	60,871,877	0.05	63,915,470	0.05	67,111,244	0.05	70,466,806
Limited Employment	0.03	493,595	0.03	508,403	0.03	523,655	0.03	539,365	0.03	555,546	0.03	572,212	0.03	589,379
Agency Health/Dental	0.10	157,300,204	0.10	173,030,224	0.10	190,333,247	0.10	209,366,572	0.10	230,303,229	0.10	253,333,552	0.10	278,666,907
Agency Social Security	0.03296	18,643,573	0.03296	19,258,065	0.03296	19,892,811	0.033	20,548,478	0.03296	21,225,756	0.03296	21,925,357	0.03296	22,648,017
Agency Pension	NA	39,981,818	NA	40,239,535	NA	40,510,138	NA	40,794,272	NA	41,092,612	NA	41,405,869	NA	41,734,789
Agency Sick/Life/Payroll Tax/Vacation	0.03126	4,061,484	0.03126	4,188,446	0.03126	4,319,377	0.0313	4,454,401	0.03126	4,593,646	0.03126	4,737,243	0.03126	4,885,329
Worker's Compensation	0.04	7,419,938	0.04	7,716,735	0.04	8,025,405	0.04	8,346,421	0.04	8,680,278	0.04	9,027,489	0.04	9,388,588
Extra Day	0.03126	-	0.03126	-	0.03126	-	0.0313	-	0.03126	-	0.03126	-	0.03126	-
Total		480,181,320		506,093,825		533,955,358		563,937,814		596,229,419		631,036,322		668,584,356
Change		24,121		25,913		27,862		29,982		32,292		34,807		37,548
Percent Change		5.3%		5.4%		5.5%		5.6%		5.7%		5.8%		6.0%
		2024		2025		2026		2027		2028		2029		2030
TOTAL EXPENDITURES		983,764,855		1,048,399,139		1,110,578,631		1,175,713,895		1,238,145,097		1,319,813,867		1,404,798,330
Pension Costs as a Percent of Total Exp		4.1%		3.8%		3.6%		3.5%		3.3%		3.1%		3.0%
Health Costs as a Percent of Total Exp		16.0%		16.5%		17.1%		17.8%		18.6%		19.2%		19.8%
Fringe Inflation		219,987,079		236,716,271		255,055,574		275,163,723		297,215,243		321,402,021		347,935,042
		7.5%		7.6%		7.7%		7.9%		8.0%		8.1%		8.3%
Pension Forecast														
Management DB Plan														
Normal Cost														
Minimum Funding of Unfunded Actuarial Liability		1,927,468		1,927,468		1,927,468		1,927,468		1,927,468		1,927,468		1,927,468
Total DB Plan		1,927,468		1,927,468		1,927,468		1,927,468		1,927,468		1,927,468		1,927,468
DC Plan		5,154,350		5,412,067		5,682,670		5,966,804		6,265,144		6,578,401		6,907,321
Union Plan														
Normal Cost		10,600,000		10,600,000		10,600,000		10,600,000		10,600,000		10,600,000		10,600,000
20 Year Amortization of UAAL		22,300,000		22,300,000		22,300,000		22,300,000		22,300,000		22,300,000		22,300,000
Total Union Plan		32,900,000		32,900,000		32,900,000		32,900,000		32,900,000		32,900,000		32,900,000
Additional Union Employees														
Total Pension Costs (w/LR Construction Fund)														
DB Plan Average Payroll per Participant														
DB Participants														
Payroll of DB Participants														
DC Plan Average Payroll per Participant		147,099		154,454		162,177		170,286		178,800		187,740		197,127
DC Participants Total		438		438		438		438		438		438		438
DC Plan Contribution		5,154,350		5,412,067		5,682,670		5,966,804		6,265,144		6,578,401		6,907,321

Table 8.
OTO Summary FY09 Budget

FY09 Summary of OTOs Division/Department	Item	Amount		
Office of the GM		*2,543,925*		
FY10 Base		*2,543,925*		
Communications and Technology		*17,699,298*		
	Operating Projects	986,256		986,256
	Force Account Green Line	52,009	*	52,009
FY10 Base		*16,661,033*		
Finance & Administration		*11,006,687*		
	Operating Projects	-		-
	Green Line Fare Maintainers	152,754		152,754
FY10 Base		*10,853,933*		
Human Resources/General Counsel		*17,794,405*		
	Operating Projects	-		-
	Compensation Study and FMLA Administrator OTO	57,500		57,500
FY09 Base		*17,736,905*		
Operations G & A				
Administration		*1,243,011*		
Operations Support		*14,852,254*		
Scheduling		*1,484,711*		
Transportation Planning		*2,001,892*		
	GreenLine Force Account Work	45,556	*	45,556
	E and D Investments	500,000	*	500,000
	NTD Validation	45,000		45,000
Operations G and A		*18,991,312*		
Agency G and A Total		*66,787,108*		
Capital Projects & Facilities		*24,754,113*		
	Operating Projects	5,768,106		
FY10 Base		18,986,007		
Operations				
Operating Projects	Division Operating Projects	8,432,298		
Bus Transportation		*111,990,721*		
Bus Maintenance	*$4.00 per gallon*	*62,503,774*		
	GreenLine Force Account Work	293,446	*	293,446
FY10 Base		174,201,049		
ATP		*47,764*		
	Professional and Technical for Eligibility	75,000		
FY10 Base		*(27,236)*		
Field Operations		*12,442,251*		
	GreenLine Force Account Work	106,976	*	106,976
FY10 Base		*12,335,275*		
Rail Transportation		15,383,753		
FY10 Base		*15,383,753*		
Rail Maintenance		18,476,095		
	GreenLine Force Account Work	60,451		60,451
FY10 Base		*18,415,644*		
Rail Maintenance of Way		12,497,865		
FY10 Base		*12,497,865*		
Total Rail FY10 Base		*46,297,262*		
Commuter Rail		5,163,540		
FY10 Base		*5,163,540*		
Streetcar		6,246,423		
FY10 Base		*6,246,423*		
Total		*346,564,780*		
Debt		*23,451,000*		
Total FY09 Adopted Budget		*370,015,780*		
G and A BUDGET		*68,626,183*		

Table 9.

Commuter Rail Operating Costs - Summary FYs09-30

		FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19
1	**TriMet Personal Services**	997,083	1,036,966	1,078,445	1,121,583	1,166,446	1,213,104	1,261,628	1,312,093	1,364,577	1,419,160	1,475,926
2	**TriMet M&S wo/fuel**	150,093	154,596	159,234	164,011	168,931	173,999	179,219	184,595	190,133	195,837	201,712
3	**Diesel Fuel**	675,525	657,957	697,434	739,280	783,637	830,655	880,494	933,324	989,323	1,048,683	1,111,604
	Railroad Services											
4	Train Operations	976,051	1,015,093	1,055,697	1,097,925	1,141,842	1,187,515	1,235,016	1,284,417	1,335,793	1,389,225	1,444,794
5	Maint. Of Way	514,332	533,693	553,793	574,659	596,320	672,630	698,190	724,721	752,261	780,846	960,441
6	MOW Capital	6,173	95,373	6,549	6,745	779,400	170,318	60,439	7,592	7,820	947,000	8,296
7	OTP Incentive	171,200	213,658	222,204	231,092	240,336	249,949	259,447	269,306	279,540	290,162	301,188
8	**Railroad Insurance/BIPD**	1,465,000	1,508,950	1,554,219	1,600,845	1,648,870	1,698,337	1,749,287	1,801,765	1,855,818	1,911,493	1,968,837
	Totals	**4,955,457**	**5,216,286**	**5,327,574**	**5,536,139**	**6,525,782**	**6,196,506**	**6,323,720**	**6,517,813**	**6,775,265**	**7,982,406**	**7,472,799**
	Divide by 1000 for FIR#1	4,955	5,216	5,328	5,536	6,526	6,197	6,324	6,518	6,775	7,982	7,473

	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19
MOW Capital	151,000	5,000	75,000	5,000	5,000	114,500	119,000	41,000	5,000	5,000	587,900	5,000
MOW Capital YOE	180,989	6,173	95,370	6,549	6,745	159,098	170,312	60,439	7,592	7,820	947,000	8,296
Inflation	1.1986	1.235	1.272	1.310	1.349	1.390	1.431	1.474	1.518	1.564	1.611	1.659

Table 9.

		FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30
1	**TriMet Personal Services**	1,534,963	1,596,362	1,660,216	1,726,625	1,795,690	1,867,518	1,942,218	2,019,907	2,100,703	2,184,732	2,272,121
2	**TriMet M&S wo/fuel**	207,764	213,997	220,417	227,029	233,840	240,855	248,081	255,523	263,189	271,085	279,217
3	**Diesel Fuel**	1,178,300	1,248,998	1,323,938	1,403,374	1,487,577	1,576,831	1,671,441	1,771,727	1,878,031	1,990,713	2,110,156
	Railroad Services											
4	Train Operations	1,502,586	1,562,689	1,625,197	1,690,205	1,757,813	1,828,125	1,901,250	1,977,300	2,056,392	2,138,648	2,224,194
5	Maint. Of Way	996,938	1,034,822	1,074,145	1,114,962	1,157,331	1,201,309	1,246,959	1,294,344	1,343,529	1,394,583	1,447,577
6	MOW Capital	128,169	212,982	101,527	104,573	107,710	110,942	114,270	117,698	121,229	124,866	128,612
7	OTP Incentive	312,634	324,514	336,845	349,645	362,932	376,723	391,039	405,898	421,322	437,332	453,951
8	**Railroad Insurance/BIPD**	2,027,903	2,088,740	2,151,402	2,215,944	2,282,422	2,350,895	2,421,422	2,494,064	2,568,886	2,645,953	2,725,332
	Totals	**7,889,256**	**8,283,103**	**8,493,687**	**8,832,358**	**9,185,315**	**9,553,199**	**9,936,680**	**10,336,462**	**10,753,282**	**11,187,911**	**11,641,159**
	Divide by 1000 for FIR#1	7,889	8,283	8,494	8,832	9,185	9,553	9,937	10,336	10,753	11,188	11,641

	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30
MOW Capital	75,000	121,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000
MOW Capital YOE	128,169	212,982	101,527	104,573	107,710	110,942	114,270	117,698	121,229	124,866	128,612
Inflation	1.709	1.760	1.813	1.867	1.923	1.981	2.041	2.102	2.165	2.230	2.297

Table 10. Commuter Rail Operating Costs and Revenues

A	B	C	D	E	G	I
Fiscal Year	Operating Cost Commuter Rail	Fares from WCCR Operations	County General Fund Payment	Net Tax Effort (Column B-Column C-Column D)	Wilsonville	Total TriMet
2008	-	0	0	-		-
2009	2,085,761	530,749	-	1,555,013	125,000	1,430,013
2010	5,383,044	856,005	990,099	3,536,940	300,000	3,236,940
2011	5,512,585	920,391	2,000,000	2,592,194	300,000	2,292,194
2012	5,741,076	989,620	2,000,000	2,751,456	300,000	2,451,456
2013	6,752,457	1,064,056	1,009,901	4,678,499	300,000	4,378,499
2014	6,446,884	1,144,091	-	5,302,793	309,000	4,993,793
2015	6,599,931	1,230,146	-	5,369,785	318,270	5,051,515
2016	6,822,164	1,322,674	-	5,499,490	327,818	5,171,672
2017	7,110,253	1,422,162	-	5,688,091	337,653	5,350,439
2018	8,350,737	1,529,133	-	6,821,605	347,782	6,473,822
2019	7,877,400	1,644,149	-	6,233,251	358,216	5,875,035
2020	8,333,295	1,767,817	-	6,565,477	368,962	6,196,515
2021	8,770,008	1,900,787	-	6,869,220	380,031	6,489,189
2022	9,027,165	2,043,759	-	6,983,406	391,432	6,591,974
2023	9,416,418	2,197,484	-	7,218,934	403,175	6,815,759
2024	9,824,294	2,362,772	-	7,461,521	415,270	7,046,251
2025	10,251,782	2,540,493	-	7,711,289	427,728	7,283,560
2026	10,699,932	2,731,581	-	7,968,351	440,560	7,527,791
2027	11,169,857	2,937,043	-	8,232,814	453,777	7,779,037
2028	11,662,731	3,157,958	-	8,504,773	467,390	8,037,383
2029	12,179,802	3,395,490	-	8,784,312	481,412	8,302,900
2030	12,722,390	3,650,889	-	9,071,501	495,854	8,575,646

Table 11. ATP Forecast

ATP Forecast	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019
OMAP/Waivered Non-Medical	14,071,681	15,923,568	16,480,893	17,057,724	17,654,745	18,272,661	18,912,204	19,574,131	20,259,226	20,968,299	21,702,189	22,461,766
Total LIFT Variable Costs	30,802,649	28,346,522	28,972,313	30,420,929	31,941,975	33,539,074	35,216,028	37,364,206	39,904,972	42,618,510	45,559,187	48,702,771
LIFT Diesel Costs		2,583,516	2,598,825	2,767,749	2,947,653	3,139,250	3,343,302	3,597,392	3,895,976	4,219,342	4,573,767	4,957,963
LIFT Eligibilty (Increased) Costs			1,404,776	1,364,269	1,399,796	1,207,811	1,250,085	1,293,838	1,339,122	1,385,992	1,434,501	1,484,709
Recertification Savings (OTO)			(553,000)	(1,650,000)	(2,766,000)	(3,318,000)	(2,756,000)	(1,659,000)	(553,000)	-		
Total LIFT Fixed Costs	-	910,754	938,077	966,219	995,205	1,025,062	1,055,813	1,087,488	1,120,112	1,153,716	1,188,327	1,223,977
Total ATP Costs/1000	**44,874**	**47,764**	**49,842**	**50,927**	**52,173**	**53,866**	**57,021**	**61,258**	**65,966**	**70,346**	**74,458**	**78,831**
Total LIFT Costs	30,802,649	31,840,792	32,509,215	34,154,897	35,884,834	37,703,386	39,615,143	42,049,086	44,921,060	47,991,568	51,321,281	54,884,711
LIFT and OMAP	44,874,330	47,764,360	49,841,884	50,926,890	52,173,374	53,865,858	57,021,432	61,258,055	65,966,408	70,345,858	74,457,971	78,831,186
Ridership Increase	4.0%	3.3%	1.5%	0.5%	0.5%	0.5%	0.5%	1.6%	2.3%	2.3%	2.4%	2.4%
Service Cost Inflation	4.0%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%
Fixed Cost Inflation	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Diesel Fuel Inflation	.		6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
OMAP Inflation	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
LIFT Ridership	1,122,040	1,159,067	1,176,453	1,182,336	1,188,247	1,194,189	1,200,159	1,219,362	1,247,407	1,276,098	1,306,724	1,338,085

Table 11. ATP Forecast

ATP Forecast	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030
OMAP/Waivered Non-Medical	23,247,927	24,061,605	24,903,761	25,775,393	26,677,531	27,611,245	28,577,639	29,577,856	30,613,081	31,684,539	32,793,498
Total LIFT Variable Costs	52,111,965	55,759,802	59,662,988	63,899,061	68,435,894	72,952,663	77,767,539	82,900,196	88,454,509	94,380,961	100,704,486
LIFT Diesel Costs	5,379,390	5,836,638	6,332,752	6,877,369	7,468,823	8,073,798	8,727,775	9,434,725	10,208,372	11,045,459	11,951,187
LIFT Eligibilty (Increased) Costs	1,536,674	1,590,457	1,646,123	1,703,738	1,763,368	1,825,086	1,888,964	1,955,078	2,023,506	2,094,328	2,167,630
Recertification Savings (OTO)											
Total LIFT Fixed Costs	1,260,696	1,298,517	1,337,473	1,377,597	1,418,925	1,461,493	1,505,338	1,550,498	1,597,013	1,644,923	1,694,271
Total ATP Costs/1000	**83,537**	**88,547**	**93,883**	**99,633**	**105,765**	**111,924**	**118,467**	**125,418**	**132,896**	**140,850**	**149,311**
Total LIFT Costs	58,752,051	62,894,958	67,333,214	72,154,027	77,323,642	82,487,953	88,000,651	93,885,419	100,259,894	107,071,343	114,349,943
LIFT and OMAP	83,536,652	88,547,020	93,883,098	99,633,157	105,764,541	111,924,284	118,467,254	125,418,353	132,896,481	140,850,210	149,311,071
Ridership Increase	2.5%	2.5%	2.5%	2.6%	2.6%	2.1%	2.1%	2.1%	2.2%	2.2%	2.2%
Service Cost Inflation	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%
Fixed Cost Inflation	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Diesel Fuel Inflation	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
OMAP Inflation	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
LIFT Ridership	1,371,538	1,405,826	1,440,972	1,478,437	1,516,876	1,548,731	1,581,254	1,614,460	1,649,978	1,686,278	1,723,376

Table 12 Capital and Operating Project Forecast

	000 YOEs	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17
	Replacement										
1	Fixed Route Buses	2	15,200	16,830	16,126	16,609	17,535	18,061	18,603	19,161	19,736
2	ATP Vehicles	2,453	2,925	2,641	3,825	3,502	721	0	0	0	3,958
3	Light Rail Vehicles										
4	Bus Shelters	72	157	157	162	167	172	177	182	188	194
5	Bus Transit Centers & Park and Rides	0	173	125	130	134	138	142	146	151	155
6	Light Rail Stations, Park & Rides, Transit Centers	0	258	311	246	216	222	229	236	243	250
7	Customer Information & CAO	0	65	32	33	62	64	66	68	70	72
8	Operations & Administration Facilities	2,786	1,907	1,800	1,321	1,082	1,114	1,148	1,182	1,218	1,254
9	LRT Shop & Trolley Barn	0	1,065	437	108	251	250	258	265	273	281
10	Light Rail Track and Structures	13	987	1,254	785	793	561	700	721	2,587	2,665
11	Light Rail Electrification and Signaling System	136	140	113	143	147	152	156	161	166	171
12	Bus Shop Equipment > $5,000	29	102	176	52	252	260	267	275	284	292
13	Bus Shop Equipment < $5,000	0	123	163	100	112	115	119	122	126	130
14	Light Rail Shop Equipment > $5,000	103	51	79	25	21	90	93	95	98	101
15	Light Rail Sop Equipment < $5,000	0	5	5	5	5	6	6	6	6	6
16	MOW Shop Equipment	33	79	21	31	40	41	42	44	45	46
17	Fare Revenue Capital Equipment (*includes Fare System Replacement*)	0	55	57	58	*2,100*	*4,200*	*16,800*	*18,900*	60	62
18	Facilities Maintenance Equipment	18	164	53	50	52	53	55	56	58	60
19	LIFT Shop Equipment	7	25								
20	Non-Revenue Vehicles	101	908	931	634	750	971	1,001	1,031	1,062	1,093
21	Closed Circuit Television Replacement			200	206	212	219	225	232	239	246
22	Information Technology	3,798	3,399	4,563	3,921	2,192	3,000	3,090	3,183	3,278	3,377
23	BDS and Radio Replacement	*125*	*2,694*	*14,436*	*16,481*	*4,143*	*2,055*	-	-	0	0
24	LIFT MDT, Dispatch, Communications		*1,442*	*1,273*	*1,093*						
	Replacement Total (includes operating projects)	**9,676**	**31,924**	**45,656**	**45,535**	**32,842**	**31,940**	**42,635**	**45,510**	**29,313**	**34,150**
	Improvement	**FY08**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14**	**FY15**	**FY16**	**FY17**
25	Bus Fleet Additions	-	-	-	1,241	852	1,317	904	1,397	959	1,482
26	LIFT Vehicle Fleet Additions	1,350	1,105	325	226	236	245	255	424	1,645	1,793
27	Light Rail Vehicles	-	-	-	-	-	-	9,194	0	0	0
28	System Security Improvements	617	1,301	761	-	-					
29	Rail Safety Enhancements	101	151	92	50	52	53	55	56	58	60
30	Eastside Station Access and Illumination Projects		580								
31	Safety Compliance	12	196	200	200	200	200	200			
32	ADA Improvements	-	25	26	27	27	28	29	30	31	32
33	Bus On-Street Related Maintenance	-	20	21	21	22	23	23	24	25	25
34	Bus Stop Development/Streamline	1,270	1,235	1,532	1,532	1,578	1,626	1,674	1,725	1,776	1,830
35	Milwaukie Bus Stops		375								
36	Hall Nimbus Bus Stops		250								
37	Millikan Park and Ride Replacement		2,300	-		-					
38	Lloyd District Transit Hub	5	-	-	-	-	-	-	-	-	-
39	North Portland Jobs Access Bus Stops	-	-	-	-	-					
40	Washington County Bus Stop and Pedestrian Improvements	-	569	-	-	-	-	-	-	-	-
41	Bike to Transit	-	50	52	53	55	56	58	60	61	63
42	Rose Quarter Bike Lane Project		100								
43	Concession Services Development	-				-	333	403	392		
44	Customer Service Projects	-	26	50	52	53	55	56	58	60	61
45	Transit Tracker by Phone Expansion	-	22	-	-	-	-	-	-	-	-
46	Park & Ride Signage and Shared Use Support	-	24	25	25	26	27	28	29	30	30

Table 12 Capital and Operating Project Forecast

	000 YOEs	**FY08**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14**	**FY15**	**FY16**	**FY17**
47	Red Line Extensions to Merlo/158th and to Willow Creek/185th	-	250	2,500	-	-					
48	Washington County Commuter Rail-$40.8 M over budget	13,907	26,893								
49	Milwaukie Pre-PE, FEIS, TriMet Share Construction	1,416	2,329		-	42,393	-	2,000	-	-	-
50	Rockwood Station Redevelopment		4,900								
51	Gresham Civic Station		200	1,144	395		-	-	-	-	-
52	TV Hwy Engineering	78		-	-	-	-	-	-	-	-
53	Gateway TOD/Rose Biggi	248	-	-							
54	ElMonica Storage Building and Office Reconfiguration	-	-		300	290					
55	Operator Rest Facility										
56	Electronic Cooling System Retrofit Project		237	-	-						
57	Conversion of MAX Track Switches to Powered Operation for Service Quality	-								-	-
58	Rail Facilities Expansion-Elmonica Office Remodel	-	-	220	-	-					
59	Operations Command Center Office Modifications		-	25							
60	Light Rail Vehicle Projects for Green Line/Mall	87	-	-	-	-	-	-	-	-	-
61	LRV Rear Facing Exterior CCTV Retrofit	440	-	-	-	-					
62	Non-Revenue Vehicle Requirements for Green Line MAX & Commuter Rail	87	135	-	-	-	-	-	-	-	-
63	Willamette Shore Trolley Program	8	92	50	50	50					
64	Rail Maintenance Equipment	-	68	36	37	38					
65	Snow and Ice Implementation	-	230	172	177	272	90				
66	Steel Bridge MAX Repairs	125	3,023	-	-	-	-			-	-
67	LRV Spare Parts		750	750							
68	I-205/Mall MAX Retrofits: Ruby Junction Facility-Expand Employee Parking	-	200	300	-	-					
69	TriMet Operating & Admin Facilities	-	-			-			2,000	2,060	2,122
70	Merlo Operating Base Improvements, LIFT base	-	-	500	-	3,988	5,982	-		-	
71	Powell Operating Base Improvements (fuel facility)	-	-			-				-	-
72	Center Street Operating Base Improvements										
73	Ruby Junction Facility Expansion-I-205		-								
74	Signal Priority-Vehicle Control System	-	-								
75	Operator Training Equipment		83								
76	Voith 863.3T Project		317								
77	Hybrid Cutaway Vehicle		150								
78	Continuously Regenerating Traps	-	1,114	48	49	51	52	54	56	57	59
79	**Information Technology Improvement - See Replacement Table 17**	-									
80	TriMet Corporate Telecommunications Network	-	100	100	100	100	103	106	109	113	116
81	Desktop Computing	-	35	-	-	-					
82	IT Security Enhancement	-	100	100	100	100	103	106	109	113	116
83	Application/Database Servers	-	-	-	-	-					
84	Telephone System Replacement Project	-	173	-	-	-	-	0			
85	Legal/HR Systems	-	-	-	-	-					-
86	Automatic Stop Announcement (ASA) System Retrofit	-	290	148	-	-	-				
87	Transit Tracker Computers *(not budgeted)*	-	-								
88	Video/Comm Systems	-	185	-	-	-	-	-	-	-	-
89	*Improvement Total (includes operating projects)*	**19,751**	**50,183**	**9,175**	**4,636**	**50,383**	**10,292**	**15,145**	**6,469**	**6,987**	**7,789**
90	**Grand Total**	29,427	82,107	54,832	50,172	83,225	42,232	57,780	51,979	36,300	41,940
91											
92	TriMet Funds Required	23,648	62,858	46,373	43,677	75,707	40,148	54,653	49,806	33,081	39,673

Table 12 Capital and Operating Project Forecast

	000 YOEs	**FY18**	**FY19**	**FY20**	**FY21**	**FY22**	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**
	Replacement										
1	Fixed Route Buses	20,328	20,938	21,566	22,213	22,880	23,566	-	25,001	25,751	26,524
2	ATP Vehicles	5,227	5,599	4,436	5,582	5,765	3,393	337	561	843	6,208
3	Light Rail Vehicles					151,410					
4	Bus Shelters	199	205	212	218	224	231	238	245	253	260
5	Bus Transit Centers & Park and Rides	160	165	170	175	180	185	191	197	203	209
6	Light Rail Stations, Park & Rides, Transit Centers	258	266	274	282	290	299	308	317	327	337
7	Customer Information & CAO	74	76	79	81	83	86	88	91	94	97
8	Operations & Administration Facilities	1,292	1,331	1,371	1,412	1,454	1,498	1,543	1,589	1,637	1,686
9	LRT Shop & Trolley Barn	290	299	307	317	326	336	346	356	367	378
10	Light Rail Track and Structures	2,745	2,827	2,912	3,000	3,090	6,392	6,583	6,781	6,984	7,194
11	Light Rail Electrification and Signaling System	176	181	187	192	198	204	210	217	223	230
12	Bus Shop Equipment > $5,000	301	310	319	329	339	349	359	370	381	393
13	Bus Shop Equipment < $5,000	134	138	142	146	151	155	160	164	169	174
14	Light Rail Shop Equipment > $5,000	104	107	111	114	117	121	125	128	132	136
15	Light Rail Sop Equipment < $5,000	7	7	7	7	7	8	8	8	8	9
16	MOW Shop Equipment	48	49	51	52	54	55	57	59	61	62
17	Fare Revenue Capital Equipment (*includes Fare System Replacement*)	64	66	68	70	72	74	76	78	81	83
18	Facilities Maintenance Equipment	61	63	65	67	69	71	73	76	78	80
19	LIFT Shop Equipment										
20	Non-Revenue Vehicles	1,126	1,160	1,195	1,231	1,268	1,306	1,345	1,385	1,427	1,469
21	Closed Circuit Television Replacement	253	261	269	277	285	294	303	312	321	331
22	Information Technology	3,478	3,582	3,690	3,800	3,914	4,032	4,153	4,277	4,406	4,538
23	BDS and Radio Replacement	0	0	0	0	0	0	0	0	0 $	-
24	LIFT MDT, Dispatch, Communications										
	Replacement Total (includes operating projects)	**36,325**	**37,630**	**37,428**	**39,564**	**192,176**	**42,654**	**16,502**	**42,212**	**43,745**	**50,396**
	Improvement	**FY18**	**FY19**	**FY20**	**FY21**	**FY22**	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**
25	Bus Fleet Additions	1,018	1,572	1,080	1,668	1,145	1,770	1,215	1,878	1,289	1,328
26	LIFT Vehicle Fleet Additions	1,953	2,129	2,320	2,441	2,655	2,888	3,141	3,416	995	1,046
27	Light Rail Vehicles	0		0	56,539	0	0	0		0	67,510
28	System Security Improvements										
29	Rail Safety Enhancements	61	63	65	67	69	71	73	76	78	80
30	Eastside Station Access and Illumination Projects										
31	Safety Compliance										
32	ADA Improvements	33	34	35	36	37	38	39	40	41	43
33	Bus On-Street Related Maintenance	26	27	28	29	29	30	31	32	33	34
34	Bus Stop Development/Streamline	1,885	1,941	1,999	2,059	2,121	2,185	2,250	2,318	2,387	2,459
35	Milwaukie Bus Stops										
36	Hall Nimbus Bus Stops										
37	Millikan Park and Ride Replacement										
38	Lloyd District Transit Hub	-	-	-	-	-	-	-	-	-	-
39	North Portland Jobs Access Bus Stops										
40	Washington County Bus Stop and Pedestrian Improvements	-	-	-	-	-	-	-	-	-	-
41	Bike to Transit	65	67	69	71	73	76	78	80	83	85
42	Rose Quarter Bike Lane Project										
43	Concession Services Development										
44	Customer Service Projects	63	65	67	69	71	73	76	78	80	83
45	Transit Tracker by Phone Expansion	-	-	-	-	-	-	-	-	-	-
46	Park & Ride Signage and Shared Use Support	31	32	33	34	35	36	37	39	40	41

Table 12 Capital and Operating Project Forecast

	000 YOEs	**FY18**	**FY19**	**FY20**	**FY21**	**FY22**	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**
47	Red Line Extensions to Merlo/158th and to Willow Creek/185th										
48	Washington County Commuter Rail-$40.8 M over budget										
49	Milwaukie Pre-PE, FEIS, TriMet Share Construction	-	-	-	-	-	-	-	-	-	-
50	Rockwood Station Redevelopment										
51	Gresham Civic Station	-	-	-	-	-	-	-	-	-	-
52	TV Hwy Engineering	-	-	-	-						
53	Gateway TOD/Rose Biggi										
54	ElMonica Storage Building and Office Reconfiguration										
55	Operator Rest Facility										
56	Electronic Cooling System Retrofit Project										
57	Conversion of MAX Track Switches to Powered Operation for Service Quality	-	-								
58	Rail Facilities Expansion-Elmonica Office Remodel										
59	Operations Command Center Office Modifications										
60	Light Rail Vehicle Projects for Green Line/Mall	-	-	-	-	-	-	-	-	-	-
61	LRV Rear Facing Exterior CCTV Retrofit										
62	Non-Revenue Vehicle Requirements for Green Line MAX & Commuter Rail	-	-	-	-	-	-	-	-	-	-
63	Willamette Shore Trolley Program									-	-
64	Rail Maintenance Equipment									-	-
65	Snow and Ice Implementation									-	-
66	Steel Bridge MAX Repairs	-	-							-	-
67	LRV Spare Parts										
68	I-205/Mall MAX Retrofits: Ruby Junction Facility-Expand Employee Parking									-	-
69	TriMet Operating & Admin Facilities	2,185	2,251	2,319	2,388	2,460	2,534	2,610	2,688	2,768	2,852
70	Merlo Operating Base Improvements, LIFT base									-	-
71	Powell Operating Base Improvements (fuel facility)									-	-
72	Center Street Operating Base Improvements						-				
73	Ruby Junction Facility Expansion-I-205	18,670									
74	Signal Priority-Vehicle Control System									-	-
75	Operator Training Equipment										
76	Voith 863.3T Project										
77	Hybrid Cutaway Vehicle										
78	Continuously Regenerating Traps	61	63	65	66	68	70	73	75	77	79
79	**Information Technology Improvement - See Replacement Table 17**									-	-
80	TriMet Corporate Telecommunications Network	119	123	127	130	134	138	143	147	151	156
81	Desktop Computing										
82	IT Security Enhancement	119	123	127	130	134	138	143	147	151	156
83	Application/Database Servers			-						-	-
84	Telephone System Replacement Project									-	-
85	Legal/HR Systems	-	-	-	-	-	-	-	-	-	-
86	Automatic Stop Announcement (ASA) System Retrofit				-	-				-	-
87	Transit Tracker Computers *(not budgeted)*										
88	Video/Comm Systems	-	-	-	-	-	-	-	-	-	-
89	*Improvement Total (includes operating projects)*	**26,291**	**8,490**	**8,332**	**65,728**	**9,034**	**10,048**	**9,908**	**11,012**	**8,174**	**75,951**
90	**Grand Total**	62,616	46,120	45,760	105,292	201,210	52,702	26,410	53,225	51,919	126,347
91											
92	TriMet Funds Required	59,300	43,754	42,341	102,820	197,682	50,116	22,766	50,520	48,152	123,516

Table 12 Capital and Operating Project Forecast

	000 YOEs	FY28	FY29	FY30
	Replacement			
1	Fixed Route Buses	27,320	28,139	28,983
2	ATP Vehicles	8,001	8,554	7,093
3	Light Rail Vehicles			
4	Bus Shelters	268	276	284
5	Bus Transit Centers & Park and Rides	215	221	228
6	Light Rail Stations, Park & Rides, Transit Centers	347	357	368
7	Customer Information & CAO	99	102	106
8	Operations & Administration Facilities	1,736	1,788	1,842
9	LRT Shop & Trolley Barn	389	401	413
10	Light Rail Track and Structures	7,410	7,632	7,861
11	Light Rail Electrification and Signaling System	237	244	251
12	Bus Shop Equipment > $5,000	404	417	429
13	Bus Shop Equipment < $5,000	180	185	191
14	Light Rail Shop Equipment > $5,000	140	144	149
15	Light Rail Sop Equipment < $5,000	9	9	9
16	MOW Shop Equipment	64	66	68
17	Fare Revenue Capital Equipment (*includes Fare System Replacement*)	86	88	91
18	Facilities Maintenance Equipment	83	85	88
19	LIFT Shop Equipment			
20	Non-Revenue Vehicles	1,514	1,559	1,606
21	Closed Circuit Television Replacement	340	351	361
22	Information Technology	4,674	4,814	4,959
23	BDS and Radio Replacement	0	0	0
24	LIFT MDT, Dispatch, Communications			
	Replacement Total (includes operating projects)	**53,515**	**55,434**	**55,379**
	Improvement	**FY28**	**FY29**	**FY30**
25	Bus Fleet Additions	1,368	1,409	1,451
26	LIFT Vehicle Fleet Additions	1,153	1,213	1,277
27	Light Rail Vehicles			
28	System Security Improvements			
29	Rail Safety Enhancements	83	85	88
30	Eastside Station Access and Illumination Projects			
31	Safety Compliance			
32	ADA Improvements	44	45	47
33	Bus On-Street Related Maintenance	35	36	37
34	Bus Stop Development/Streamline	2,533	2,609	2,687
35	Milwaukie Bus Stops			
36	Hall Nimbus Bus Stops			
37	Millikan Park and Ride Replacement			
38	Lloyd District Transit Hub	-	-	-
39	North Portland Jobs Access Bus Stops			
40	Washington County Bus Stop and Pedestrian Improvements	-	-	-
41	Bike to Transit	88	90	93
42	Rose Quarter Bike Lane Project			
43	Concession Services Development			
44	Customer Service Projects	85	88	90
45	Transit Tracker by Phone Expansion	-	-	-
46	Park & Ride Signage and Shared Use Support	42	43	45

Table 12 Capital and Operating Project Forecast

	000 YOEs	FY28	FY29	FY30
47	Red Line Extensions to Merlo/158th and to Willow Creek/185th			
48	Washington County Commuter Rail-$40.8 M over budget			
49	Milwaukie Pre-PE, FEIS, TriMet Share Construction	-	-	-
50	Rockwood Station Redevelopment			
51	Gresham Civic Station	-	-	-
52	TV Hwy Engineering			
53	Gateway TOD/Rose Biggi			
54	ElMonica Storage Building and Office Reconfiguration			
55	Operator Rest Facility			
56	Electronic Cooling System Retrofit Project			
57	Conversion of MAX Track Switches to Powered Operation for Service Quality			
58	Rail Facilities Expansion-Elmonica Office Remodel			
59	Operations Command Center Office Modifications			
60	Light Rail Vehicle Projects for Green Line/Mall	-	-	-
61	LRV Rear Facing Exterior CCTV Retrofit			
62	Non-Revenue Vehicle Requirements for Green Line MAX & Commuter Rail	-	-	-
63	Willamette Shore Trolley Program	-	-	-
64	Rail Maintenance Equipment	-	-	-
65	Snow and Ice Implementation	-	-	-
66	Steel Bridge MAX Repairs	-	-	-
67	LRV Spare Parts			
68	I-205/Mall MAX Retrofits: Ruby Junction Facility-Expand Employee Parking	-	-	-
69	TriMet Operating & Admin Facilities	2,937	3,025	3,116
70	Merlo Operating Base Improvements, LIFT base	-	-	-
71	Powell Operating Base Improvements (fuel facility)	-	-	-
72	Center Street Operating Base Improvements			
73	Ruby Junction Facility Expansion-I-205			
74	Signal Priority-Vehicle Control System	-	-	-
75	Operator Training Equipment			
76	Voith 863.3T Project			
77	Hybrid Cutaway Vehicle			
78	Continuously Regenerating Traps	82	84	87
79	**Information Technology Improvement - See Replacement Table 17**	-	-	-
80	TriMet Corporate Telecommunications Network	160	165	170
81	Desktop Computing			
82	IT Security Enhancement	160	165	170
83	Application/Database Servers	-	-	-
84	Telephone System Replacement Project	-	-	-
85	Legal/HR Systems	-	-	-
86	Automatic Stop Announcement (ASA) System Retrofit	-	-	-
87	Transit Tracker Computers *(not budgeted)*			
88	Video/Comm Systems	-	-	-
89	*Improvement Total (includes operating projects)*	**8,769**	**9,058**	**9,358**
90	**Grand Total**	62,284	64,492	64,737
91				
92	TriMet Funds Required	58,386	61,526	60,701

Table 13. Debt Service

		FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19
1	2001 BLRT/Buses	2,669,000	2,669,000	2,633,005	2,637,190	1,762,396	-	-	-	-	-	-	-
2	2003 BLRT Retrofit	1,877,000	1,879,000	1,866,350	1,862,312	1,859,667	1,853,633	1,850,233	1,854,100	1,840,708	1,840,208	-	-
3	2005 Airport												
4	2000 Interstate MAX												
5	2005 Airport Interstate MAX	5,297,050	5,299,150	5,296,650	5,298,375	5,297,625	5,298,625	5,300,875	5,299,000	5,297,625	5,296,250	5,299,250	5,296,125
6	Equipment Lease	21,500	21,500	21,500	21,500	21,500	21,500	21,500	21,500	21,500	21,500	21,500	21,500
7	2005 GARVEE Bonds	9,093,387	10,524,612	10,521,412	10,520,825	10,515,363	10,512,097	10,506,981	10,506,356	1,412,344	1,421,156	-	
8	2007 Senior Lien Bonds	3,095,500	3,079,000	3,065,375	3,049,500	3,031,375	3,011,000	2,993,250	2,973,000	2,955,125	2,939,375	2,928,650	2,923,250
9	2008 Series A (Commuter Rail, '09, '10 Buses)		831,098	3,869,913	3,869,813	3,878,138	3,870,300	3,870,988	3,869,463	3,870,263	3,872,763	3,871,863	3,871,650
10	2010 Buses/Communications			2,552,548	3,006,302	3,006,302	3,006,302	3,006,302	3,006,302	3,006,302	3,006,302	3,006,302	3,006,302
11	2011 Buses/Communications				1,938,239	1,938,239	1,938,239	1,938,239	1,938,239	1,938,239	1,938,239	1,938,239	1,938,239
12	2011 GARVEE Bonds					3,700,000	3,700,000	3,700,000	3,700,000	12,996,181	12,997,825	12,998,206	12,995,325
13	2012 Buses/Communications					2,171,287	2,171,287	2,171,287	2,171,287	2,171,287	2,171,287	2,171,287	2,171,287
14	2012 Milwaukie Construction					3,528,250	3,528,250	3,528,250	3,528,250	3,528,250	3,528,250	3,528,250	3,528,250
15	2013 Buses/Fare System						2,260,422	2,260,422	2,260,422	2,260,422	2,260,422	2,260,422	2,260,422
16	2013 Merlo Garage Improvements						424,427	424,427	424,427	424,427	424,427	424,427	424,427
17	2014 Buses/Fare System							3,312,333	3,312,333	3,312,333	3,312,333	3,312,333	3,312,333
18	2014 2 LRVs/Merlo Improvements							699,410	699,410	699,410	699,410	699,410	699,410
19	2015 Buses/Fare System								3,563,345	3,563,345	3,563,345	3,563,345	3,563,345
20	2016 Buses									1,820,606	1,820,606	1,820,606	1,820,606
21	2017 Buses										2,251,286	2,251,286	2,251,286
22	2018 Buses											2,428,075	2,428,075
23	2018 RJ Facility											1,420,241	1,420,241
24	2019 Replacement Buses												2,521,377
25	2020 Buses												
26	2021 Buses												
27	2021 10 Additional LRVs												
28	2022 Buses												
29	2022 Type 1 LRV Replacement												
30	2023 Buses												
31	2025 Buses												
32	2026 Buses												
33	2027 10 Additional LRVs												
34	2027 Buses												
35	2028 Buses												
36	Total	22,053,437	24,303,360	29,826,753	32,204,056	40,710,142	41,596,083	45,584,497	49,127,434	51,118,368	53,364,984	53,943,693	56,453,452

Table 13. Debt Service

		FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30
1	2001 BLRT/Buses	-										
2	2003 BLRT Retrofit	-										
3	2005 Airport											
4	2000 Interstate MAX											
5	2005 Airport Interstate MAX	5,296,375	5,299,250									
6	Equipment Lease	21,500	21,500									
7	2005 GARVEE Bonds											
8	2007 Senior Lien Bonds	2,920,350	2,919,750	2,918,906	2,912,625	2,908,050	2,904,968	2,903,169	2,902,437	2,897,668	2,893,756	2,890,488
9	2008 Series A (Commuter Rail, '09, '10 Buses)	3,871,463	3,870,063	3,871,563	3,871,438	3,869,438	3,870,188	3,874,031	3,870,256	3,872,162	3,874,094	-
10	2010 Buses/Communications	3,006,302	3,006,302									
11	2011 Buses/Communications	1,938,239	1,938,239	1,938,239	1,938,239	1,938,239	1,938,239					
12	2011 GARVEE Bonds	12,996,737	12,995,787	12,997,925	12,999,925	12,996,950	12,995,250	10,109,450				
13	2012 Buses/Communications	2,171,287	2,171,287	2,171,287	2,171,287	2,171,287	2,171,287	2,171,287				
14	2012 Milwaukie Construction	3,528,250	3,528,250	3,528,250	3,528,250	3,528,250	3,528,250	3,528,250	3,528,250	3,528,250	3,528,250	3,528,250
15	2013 Buses/Fare System	2,260,422	2,260,422	2,260,422	2,260,422	2,260,422	2,260,422	2,260,422	2,260,422			
16	2013 Merlo Garage Improvements	424,427	424,427	424,427	424,427	424,427	424,427	424,427	424,427	424,427	424,427	424,427
17	2014 Buses/Fare System	3,312,333	3,312,333	3,312,333	3,312,333	3,312,333	3,312,333	3,312,333	3,312,333	3,312,333		
18	2014 2 LRVs/Merlo Improvements	699,410	699,410	699,410	699,410	699,410	699,410	699,410	699,410	699,410	699,410	699,410
19	2015 Buses/Fare System	3,563,345	3,563,345	3,563,345	3,563,345	3,563,345	3,563,345	3,563,345	3,563,345	3,563,345	3,563,345	
20	2016 Buses	1,820,606	1,820,606	1,820,606	1,820,606	1,820,606	1,820,606	1,820,606	1,820,606	1,820,606	1,820,606	1,820,606
21	2017 Buses	2,251,286	2,251,286	2,251,286	2,251,286	2,251,286	2,251,286	2,251,286	2,251,286	2,251,286	2,251,286	2,251,286
22	2018 Buses	2,428,075	2,428,075	2,428,075	2,428,075	2,428,075	2,428,075	2,428,075	2,428,075	2,428,075	2,428,075	2,428,075
23	2018 RJ Facility	1,420,241	1,420,241	1,420,241	1,420,241	1,420,241	1,420,241	1,420,241	1,420,241	1,420,241	1,420,241	1,420,241
24	2019 Replacement Buses	2,521,377	2,521,377	2,521,377	2,521,377	2,521,377	2,521,377	2,521,377	2,521,377	2,521,377	2,521,377	2,521,377
25	2020 Buses	2,470,578	2,470,578	2,470,578	2,470,578	2,470,578	2,470,578	2,470,578	2,470,578	2,470,578	2,470,578	2,470,578
26	2021 Buses		2,640,960	2,640,960	2,640,960	2,640,960	2,640,960	2,640,960	2,640,960	2,640,960	2,640,960	2,640,960
27	2021 10 Additional LRVs		4,300,931	4,300,931	4,300,931	4,300,931	4,300,931	4,300,931	4,300,931	4,300,931	4,300,931	4,300,931
28	2022 Buses			2,721,642	2,721,642	2,721,642	2,721,642	2,721,642	2,721,642	2,721,642	2,721,642	2,721,642
29	2022 Type 1 LRV Replacement			11,517,893	11,517,893	11,517,893	11,517,893	11,517,893	11,517,893	11,517,893	11,517,893	11,517,893
30	2023 Buses				2,561,502	2,561,502	2,561,502	2,561,502	2,561,502	2,561,502	2,561,502	2,561,502
31	2025 Buses						2,428,736	2,428,736	2,428,736	2,428,736	2,428,736	2,428,736
32	2026 Buses							2,703,572	2,703,572	2,703,572	2,703,572	2,703,572
33	2027 10 Additional LRVs								5,135,536	5,135,536	5,135,536	5,135,536
34	2027 Buses								3,109,958	3,109,958	3,109,958	3,109,958
35	2028 Buses									3,355,948	3,355,948	3,355,948
36	Total	58,922,604	65,864,419	71,779,695	74,336,791	74,327,241	76,751,945	74,633,522	70,593,772	71,686,435	68,372,122	60,931,415

Table 14A. Green Line (I-205) 2009

Position	Factors for Calculating Requirements		Miles, Hrs, Vehicles	Requirement	Cost per Position FY09	Total Cost
1. Operators (includes Mall shuttle)	Annual Hrs/Operator	1600.000	61,682	39	$76,573	$2,951,985
2. Field Operations (Controllers, Supervisors, F.I.)				11	$88,478	$973,258
3. Station Agents				0	$91,837	$0
4. Security Data/CCTV Coordinator				0	$80,000	$0
5. LRV Mechanics	Per 110000 Car Miles	1.0	1,553,454	14	$76,026	$1,073,663
6. LRV Cleaners	Per LRV	0.18	24	4	$74,204	$309,038
7. MOW Cleaner, Laborers, Landscapers	Per Route Mile	1.00	8.3	6	$74,204	$445,224
8. MOW Technicians, Maintainers (incl. TVM Mntnrs)	Per Route Mile	1.00	8.3	9	$81,674	$735,066
9. Rail Transportation Training Supervisor				1	$80,261	$80,261
10. Rail MOW Supervisor/Engineer				1	$89,156	$89,156
11. Transportation Overtime	Annual Cost per Operator	$ 12,381	39	39	$12,381	$482,859
Total Employees Excluding Security				85		$7,140,509
Materials/Services						
				FY09$		
1. Propulsion	Cost per Car Mile	$ 0.490	1,553,454	$ 760,507		
2. Employee Expense (Overtime, Supplies…)	Per Employee	5,591	85	$ 474,338		
3. LRV Expense	Per Annual Car Miles	$ 0.41	1,553,454	$ 634,535		
4. Police Services		*Police Services Added in FY09 Budget for Green Line*				
5. ROW Expense	Per Route Mile	$52,072	8.3	$ 432,201		
6. Additional PMMI Costs beginning FY10				$ 269,550		
Total				$ 2,571,130		
						2009
						$ 9,711,640
						2010-10 Months
						$ 8,732,908

Table 14B Green Line (I-205) 2030

Position	Factors for Calculating Requirements			Miles, Hrs, Vehicles		Requirement	Cost per Position FY09	Total Cost
1. Operators (includes Mall shuttle)	Annual Hrs/Operator		1600.000	73,381		46	$76,573	$3,511,877
2. Field Operations (Controllers, Supervisors, F.I.)						11	$88,478	$973,258
3. Station Agents						3	$91,837	$275,511
4. Security Data/CCTV Coordinator						1	$80,000	$80,000
5. LRV Mechanics	Per 110000 Car Miles		1.0	2,071,893		19	$76,026	$1,431,979
6. LRV Cleaners	Per LRV		0.18	24		4	$74,204	$309,038
7. MOW Cleaner, Laborers, Landscapers	Per Route Mile		1.00	8.3		6	$74,204	$445,224
8. MOW Technicians, Maintainers (incl. TVM Mntnrs)	Per Route Mile		1.00	8.3		9	$81,674	$735,066
9. Rail Transportation Training Supervisor						1	$80,261	$80,261
10. Rail MOW Supervisor/Engineer						1	$89,156	$89,156
11. Transportation Overtime	Annual Cost per Operator	$	12,381	39		39	$12,381	$482,859
Total Employees Excluding Security						101		$8,414,229
Materials/Services								
						FY09$		
1. Propulsion	Cost per Car Mile	$	0.49	2,071,893	$	1,014,314		
2. Employee Expense (Overtime, Supplies…)	Per Employee		5,591	101	$	563,934		
3. LRV Expense	Per Annual Car Miles	$	0.41	2,071,893	$	846,300		
4. Police Services			*Police Services Added in FY09 Budget for Green Line*					
5. ROW Expense	Per Route Mile		$52,072	8.3	$	432,201		
6. Additional PMMI Costs beginning FY10					$	273,000		
Total					$	3,129,749		
								2009
							$	11,543,978
							2010-10 Months	
							$	10,380,585

Table 15 A

Milwaukie 2016

Personal Services	*Factors for Calculating Requirements*		*Miles, Hrs, Vehicles*	*Requirement*	*Cost per Position FY09*	*Total Cost*
1. Operators (includes Mall shuttle)	Annual Hrs/Operator	1800	37,084	21	$76,573	$1,577,574
2. Field Operations (Fare Inspectors)				3	$88,478	$265,434
3. LRV Mechanics	Per 110000 Car Miles	1.0	800,299	7	$76,026	$553,123
4. LRV Cleaners	Per LRV	0.18	21	4	$74,204	$274,991
5. MOW Cleaner, Laborers, Landscapers	Per Route Mile	1.00	7.52	8	$74,204	$558,014
6. MOW Technicians, Maintainers (incl. TVM Mntnrs)	Per Route Mile	1.00	7.52	8	$81,674	$614,188
7. Rail Transportation Training Supervisor				1	$89,156	$89,156
8. Overtime, Shift Differential, Longevity	Per Employee Cost	$ 12,796	51			$647,803
Total Employees Excluding Security				51		$4,580,283

Materials and Services					FY08$	
1. Propulsion	Cost per Car Mile	$ 0.48	800,299	$	380,927	
2. Employee Expense	Per Employee	5,350	51	$	270,812	
3. LRV Expense	Per Annual Car Miles	$ 0.45	800,299	$	357,996	
4. Police Services	Per Route Mile	1.00	8	$	827,200	
5. Railroad Insurance				$	1,000,000	
6. ROW Expense	Per Route Mile	$69,647	8	$	557,173	
Total				$	3,394,108	
				$	3,013,181	2009
						$ 7,974,391
						2010-10 Months
						$ 7,170,738

Table 15 B

Personal Services	*Factors for Calculating Requirements*		*Miles, Hrs, Vehicles*	*Requirement*	*Cost per Position FY09*	*Total Cost*
1. Operators (includes Mall shuttle)	Annual Hrs/Operator	1800	39,408	22	$76,573	$1,676,438
2. Field Operations (Fare Inspectors)				3	$88,478	$265,434
3. LRV Mechanics	Per 110000 Car Miles	1.0	850,467	8	$76,026	$587,796
4. LRV Cleaners	Per LRV	0.18	21	4	$74,204	$274,991
5. MOW Cleaner, Laborers, Landscapers	Per Route Mile	1.00	7.52	8	$74,204	$558,014
6. MOW Technicians, Maintainers (incl. TVM Mntnrs)	Per Route Mile	1.00	7.52	8	$81,674	$614,188
7. Rail Transportation Training Supervisor				1	$89,156	$89,156
8. Overtime, Shift Differential, Longevity	Per Employee Cost	$ 12,796	52			$670,160
Total Employees Excluding Security				52		$4,736,179
Materials and Services						
				FY08$		
1. Propulsion	Cost per Car Mile	$ 0.48	850,467	$ 404,806		
2. Employee Expense	Per Employee	5,350	52	$ 280,159		
3. LRV Expense	Per Annual Car Miles	$ 0.45	850,467	$ 380,438		
4. Police Services	Per Route Mile	1.00	8	$ 827,200		
5. Railroad Insurance				$ 1,000,000		
6. ROW Expense	Per Route Mile	$69,647	8	$ 557,173		
Total				$ 3,449,775		
				$ 3,044,969		2009
						$ 8,185,954
						2010-10 Months
						$ 7,360,980

Table 16. Columbia River Crossing Light Rail Operating Costs PSU to Clark

PSU to Clark College 2030

Position	*Factors for Calculating Requirements*		*Miles, Hrs, Vehicles*	*Requirement*	*Cost per Position FY09*	*Total Cost*	*Difference from EXPO*
1. Operators	Annual Hrs/Operator	1600.000	74,167	46	$76,573	$3,549,494	$1,165,489
2. Field Operations (Controllers, Supervisors, F.I.)				2	$88,478	$176,956	$0
3. LRV Mechanics	Per 110000 Car Miles	1.0	1,600,599	15	$76,026	$1,106,247	$363,176
4. LRV Cleaners	Per LRV	0.18	35	6	$74,204	$458,319	$222,612
5. MOW Cleaner, Laborers, Landscapers	Per Route Mile	1.00	10.34	17	$74,204	$1,286,697	$728,683
7. MOW Technicians, Maintainers	Per Route Mile	1.00	10.34	10	$81,674	$844,509	$230,321
6. Rail Transportation Supervisor				1	$80,261	$80,261	$0
7. Transportation Overtime	Per Employee Cost $	12,796	98			$1,251,005	$456,036
Total Employees				98		$8,753,487	*$3,166,317*

Materials/Services

				FY09	*Difference from EXPO*	
1. Propulsion	Cost per Car Mile $	0.49	1,600,599	$ 791,438	$ 259,826	
2. Employee Expense	Per Employee	$5,350	98	$ 522,979	$ 190,645	
3. LRV Expense	Per Annual Car Miles $	0.42	1,600,599	$ 674,693	$ 221,499	
4. Police Services	Per Employee	$115,000	10	$ 1,189,100	$ 324,300	
5. ROW Expense	Per Route Mile	$69,647	10.34	$ 720,146	$ 196,403	
Total				$ 3,898,356	$ 1,192,673	$4,358,989

2009	2010
$ 12,651,844	2011

Appendix B

Exhibit 1. Expenses (Fixed Route)

Fiscal Year	Operations Costs [1] (Adj. CPI 08)	Percent Change	Ops Costs/Veh Hr (Unadj. CPI)	Percent Change	Bus Ops Costs/Veh Hr (Unadj. CPI)	Percent Change	Rail Ops Costs/Veh Hr (Unadj. CPI)	Percent Change	Capital [2] Expense	Percent Change
71	$34,540,345		$9.04							
72	$37,592,408	8.8%	$9.42	4.3%						
73	$40,812,909	8.6%	$10.28	9.1%						
74	$44,942,979	10.1%	$11.50	11.8%						
75	$56,793,301	26.4%	$12.68	10.3%						
76	$80,496,505	41.7%	$16.83	32.7%						
77	$91,206,006	13.3%	$19.31	14.8%						
78	$98,396,276	7.9%	$21.67	12.2%						
79	$101,169,888	2.8%	$24.68	13.9%						
80	$105,971,263	4.7%	$27.74	12.4%						
81	$114,405,236	8.0%	$32.26	16.3%						
82	$116,778,285	2.1%	$33.86	5.0%						
83	$121,270,770	3.8%	$32.98	-2.6%						
84	$122,216,783	0.8%	$35.33	7.1%					$195,000	
85	$118,500,158	-3.0%	$39.24	11.1%					$312,000	60.0%
86	$114,893,353	-3.0%	$38.48	-1.9%					$558,000	78.8%
87	$112,605,199	-2.0%	$38.21	-0.7%	$36.41		$100.69		$1,577,000	182.6%
88	$116,825,150	3.7%	$40.45	5.9%	$38.30	5.2%	$98.17	-2.5%	$2,517,000	59.6%
89	$118,109,347	1.1%	$42.94	6.2%	$40.59	6.0%	$105.53	7.5%	$1,254,000	-50.2%
90	$118,324,880	0.2%	$44.29	3.1%	$41.40	2.0%	$120.72	14.4%	$2,726,000	117.4%
91	$117,454,592	-0.7%	$45.84	3.5%	$42.61	2.9%	$133.39	10.5%	$3,919,000	43.8%
92	$120,180,900	2.3%	$47.82	4.3%	$44.27	3.9%	$143.79	7.8%	$4,471,000	14.1%
93	$126,262,146	5.1%	$50.27	5.1%	$46.45	4.9%	$156.58	8.9%	$7,780,000	74.0%
94	$130,458,685	3.3%	$50.65	0.7%	$46.66	0.5%	$167.78	7.2%	$18,800,000	141.6%
95	$138,140,397	5.9%	$54.07	6.8%	$50.13	7.4%	$172.55	2.8%	$5,300,000	-71.8%
96	$138,462,816	0.2%	$54.67	1.1%	$50.13	0.0%	$193.43	12.1%	$2,849,000	-46.2%
97	$142,407,619	2.8%	$58.14	6.3%	$53.44	6.6%	$201.38	4.1%	$7,672,000	169.3%
98	$145,808,505	2.4%	$58.94	1.4%	$53.09	-0.6%	$222.89	10.7%	$14,291,000	86.3%
99	$163,854,278	12.4%	$63.53	7.8%	$53.32	0.4%	$215.51	-3.3%	$19,022,000	33.1%
00	$180,937,967	10.4%	$69.69	9.7%	$58.39	9.5%	$228.31	5.9%	$17,225,000	-9.4%
01	$184,130,847	1.8%	$71.97	3.3%	$60.18	3.1%	$237.67	4.1%	$17,917,000	4.0%
02	$193,653,271	5.2%	$74.80	3.9%	$62.81	4.4%	$208.56	-12.2%	$14,678,000	-18.1%
03	$199,415,775	3.0%	$77.99	4.3%	$65.90	4.9%	$206.68	-0.9%	$20,349,000	38.6%
04	$203,949,845	2.3%	$80.90	3.7%	$69.00	4.7%	$201.98	-2.3%	$10,554,000	-48.1%
05	$224,279,212	10.0%	$89.94	11.2%	$76.54	10.9%	$201.03	-0.5%	$11,331,000	7.4%
06	$225,915,198	0.7%	$96.82	7.6%	$83.29	8.8%	$207.53	3.2%	$6,635,000	-41.4%
07	$224,335,711	-0.7%	$98.71	2.0%	$85.19	2.3%	$209.82	1.1%	$7,086,000	6.8%
08	$231,137,133	3.0%	$103.60	5.0%	$89.11	4.6%	$220.24	5.0%	$19,909,000	181.0%

1) Does not include General Admin, OMAP, ATP, WS, Streetcar costs, Intergovernmental Transfers, and Medical Plans-Retired/Disabled.

2) Tri-Met Funds Only

Exhibit 2. Employer Taxes

Fiscal Year	Employer Tax Rate	Percent Change	Employer Tax / 0.10%[1] (Unadj. CPI)	Percent Change	Employer Tax (Municipal & Private)	Percent Change	Self-Employment Tax	Percent Change	State-In-Lieu Tax	Percent Change
71										
72	0.3000%		$2,028,131		$6,084,394					
73	0.3000%	0.0%	$2,173,029	7.1%	$6,519,087	7.1%				
74	0.3000%	0.0%	$2,444,577	12.5%	$7,333,731	12.5%				
75	0.3500%	16.7%	$2,573,909	5.3%	$9,008,681	22.8%				
76	0.4500%	28.6%	$2,759,626	7.2%	$12,418,315	37.8%				
77	0.5000%	11.1%	$3,409,760	23.6%	$17,048,800	37.3%				
78	0.5000%	0.0%	$3,996,941	17.2%	$19,984,707	17.2%				
79	0.6000%	20.0%	$4,546,086	13.7%	$27,276,514	36.5%				
80	0.6000%	0.0%	$5,479,011	20.5%	$32,874,065	20.5%				
81	0.6000%	0.0%	$5,827,542	6.4%	$34,965,250	6.4%				
82	0.6000%	0.0%	$6,262,419	7.5%	$37,574,511	7.5%			$906,000	
83	0.6000%	0.0%	$6,297,167	0.6%	$36,123,000	-3.9%	$1,660,000		$1,000,000	10.4%
84	0.6000%	0.0%	$6,687,850	6.2%	$38,052,838	5.3%	$2,074,264	25.0%	$1,478,000	47.8%
85	0.6000%	0.0%	$7,364,778	10.1%	$41,654,862	9.5%	$2,533,807	22.2%	$1,403,573	-5.0%
86	0.6000%	0.0%	$7,789,362	5.8%	$44,022,185	5.7%	$2,713,989	7.1%	$1,169,561	-16.7%
87	0.6000%	0.0%	$8,179,553	5.0%	$46,176,152	4.9%	$2,901,166	6.9%	$1,479,073	26.5%
88	0.6000%	0.0%	$8,811,772	7.7%	$49,542,391	7.3%	$3,328,239	14.7%	$1,481,419	0.2%
89	0.6125%	2.1%	$9,606,641	9.0%	$54,818,707	10.7%	$4,021,969	20.8%	$1,556,562	5.1%
90	0.6176%	0.8%	$10,538,980	9.7%	$60,452,960	10.3%	$4,635,782	15.3%	$1,698,887	9.1%
91	0.6176%	0.0%	$11,504,067	9.2%	$66,181,424	9.5%	$4,867,695	5.0%	$1,923,287	13.2%
92	0.6176%	0.0%	$12,108,364	5.3%	$69,780,185	5.4%	$5,001,074	2.7%	$2,068,403	7.5%
93	0.6176%	0.0%	$13,232,123	9.3%	$76,438,757	9.5%	$5,282,833	5.6%	$2,226,765	7.7%
94	0.6176%	0.0%	$14,135,693	6.8%	$81,948,251	7.2%	$5,353,787	1.3%	$2,233,274	0.3%
95	0.6176%	0.0%	$15,487,585	9.6%	$90,006,140	9.8%	$5,645,185	5.4%	$2,342,733	4.9%
96	0.6176%	0.0%	$17,209,840	11.1%	$100,477,571	11.6%	$5,810,399	2.9%	$1,784,098	-23.8%
97	0.6176%	0.0%	$19,444,683	13.0%	$113,734,961	13.2%	$6,355,404	9.4%	$1,390,597	-22.1%
98	0.6176%	0.0%	$20,979,186	7.9%	$122,866,495	8.0%	$6,700,960	5.4%	$1,407,539	1.2%
99	0.6176%	0.0%	$22,141,171	5.5%	$130,309,622	6.1%	$6,434,248	-4.0%	$1,470,637	4.5%
00	0.6176%	0.0%	$23,461,331	6.0%	$138,289,322	6.1%	$6,607,857	2.7%	$1,683,494	14.5%
01	0.6195%	0.3%	$25,526,599	8.8%	$151,578,460	9.6%	$6,558,821	-0.7%	$1,675,539	-0.5%
02	0.6218%	0.4%	$24,689,291	-3.3%	$146,228,706	-3.5%	$7,289,303	11.1%	$1,941,060	15.8%
03	0.6218%	0.0%	$24,450,199	-1.0%	$145,230,698	-0.7%	$6,800,640	-6.7%	$1,869,316	-3.7%
04	0.6218%	0.0%	$24,669,316	0.9%	$146,124,768	0.6%	$7,269,039	6.9%	$1,855,350	-0.7%
05	0.6318%	1.6%	$25,949,693	5.2%	$155,987,324	6.7%	$7,962,837	9.5%	$1,970,868	6.2%
06	0.6418%	1.6%	$28,555,986	10.0%	$173,786,460	11.4%	$9,485,857	19.1%	$1,990,090	1.0%
07	0.6518%	1.6%	$30,537,303	6.9%	$187,531,204	7.9%	$11,510,937	21.3%	$2,259,404	13.5%
08	0.6618%	1.5%	$31,920,322	4.5%	$200,048,477	6.7%	$11,200,216	-2.7%	$2,254,669	-0.2%

1) Includes Self-Employment Tax

Exhibit 3. Fares and Passenger Revenue (Fixed Route)

Fiscal Year	Partland CPI-W	Percent Change	Passenger Rev [1] (Unadj. CPI)	Percent Change	Pass Rev/Veh Hr (Unadj. CPI)	Percent Change	Average Fare (Unadj. CPI)	Percent Change	Base Fare (Adj. CPI 08)	Zone Surcharge	2-Zone Monthly Pass	Pass Rev/Sys Cst (Unadj. CPI)	Percent Change
71	39.85		$4,700,000		$6.39		$0.32		$1.82	$0.10	$0	56.56%	
72	40.98	2.8%	$5,904,000	25.6%	$7.48	17.0%	$0.34	7.2%	$1.77	$0.10	$0	62.53%	10.6%
73	42.71	4.2%	$6,155,000	4.3%	$7.52	0.6%	$0.34	0.4%	$1.70	$0.10	$0	57.22%	-8.5%
74	47.03	10.1%	$6,874,000	11.7%	$7.75	3.0%	$0.33	-2.8%	$1.54	$0.10	$0	51.69%	-9.7%
75	51.93	10.4%	$7,291,000	6.1%	$6.50	-16.1%	$0.32	-3.9%	$1.40	$0.00	$13	39.02%	-24.5%
76	55.76	7.4%	$8,191,000	12.3%	$6.36	-2.1%	$0.29	-9.5%	$1.30	$0.00	$13	31.92%	-18.2%
77	59.69	7.0%	$9,545,000	16.5%	$7.02	10.3%	$0.31	7.8%	$1.39	$0.00	$14	30.81%	-3.5%
78	65.35	9.5%	$10,315,000	8.1%	$7.20	2.6%	$0.32	0.9%	$1.43	$0.00	$16	28.29%	-8.2%
79	72.97	11.7%	$12,457,000	20.8%	$8.63	19.8%	$0.38	18.8%	$1.28	$0.20	$16	29.44%	4.1%
80	83.76	14.8%	$15,538,000	24.7%	$10.06	16.6%	$0.39	4.0%	$1.36	$0.20	$18	29.96%	1.8%
81	91.17	8.8%	$19,029,000	22.5%	$12.20	21.2%	$0.50	29.0%	$1.48	$0.25	$21	32.56%	8.7%
82	97.05	6.4%	$18,671,000	-1.9%	$11.56	-5.2%	$0.51	0.2%	$1.39	$0.25	$21	28.76%	-11.7%
83	98.47	1.5%	$18,659,000	-0.1%	$10.68	-7.6%	$0.51	1.1%	$1.58	$0.25	$32	26.69%	-7.2%
84	103.23	4.8%	$18,011,913	-3.5%	$10.45	-2.1%	$0.49	-4.0%	$1.51	$0.25	$32	24.62%	-7.8%
85	104.51	1.2%	$18,088,617	0.4%	$11.88	13.6%	$0.51	3.5%	$1.49	$0.25	$32	25.70%	4.4%
86	105.2	0.7%	$18,380,676	1.6%	$12.13	2.1%	$0.55	7.4%	$1.67	$0.25	$32	27.07%	5.3%
87	107.53	2.2%	$19,532,670	6.3%	$12.77	5.3%	$0.55	1.2%	$1.64	$0.25	$32	28.42%	5.0%
88	110.9	3.1%	$21,224,604	8.7%	$13.73	7.5%	$0.60	8.3%	$1.59	$0.25	$36	28.65%	0.8%
89	116.4	5.0%	$21,420,339	0.9%	$13.87	1.0%	$0.57	-4.3%	$1.51	$0.30	$27	27.00%	-5.7%
90	121.8	4.6%	$22,272,167	4.0%	$14.19	2.3%	$0.56	-1.7%	$1.45	$0.30	$27	26.16%	-3.1%
91	129.6	6.4%	$25,591,723	14.9%	$15.97	12.6%	$0.61	7.7%	$1.44	$0.30	$29	28.62%	9.4%
92	135.5	4.6%	$26,281,298	2.7%	$15.99	0.1%	$0.60	-1.3%	$1.38	$0.30	$29	27.12%	-5.2%
93	140.3	3.5%	$27,387,384	4.2%	$16.11	0.7%	$0.62	4.2%	$1.40	$0.30	$31	25.45%	-6.2%
94	144.3	2.9%	$27,905,335	1.9%	$15.56	-3.4%	$0.61	-1.8%	$1.36	$0.30	$31	24.34%	-4.4%
95	149.1	3.3%	$30,228,148	8.3%	$16.45	5.7%	$0.64	4.8%	$1.39	$0.30	$33	23.90%	-1.8%
96	153.9	3.2%	$31,843,133	5.3%	$16.93	2.9%	$0.65	0.8%	$1.35	$0.30	$33	24.63%	3.1%
97	159	3.3%	$34,627,104	8.7%	$18.43	8.8%	$0.67	3.7%	$1.37	$0.30	$36	24.10%	-2.2%
98	162.2	2.0%	$35,518,635	2.6%	$18.35	-0.4%	$0.67	-0.2%	$1.34	$0.30	$36	23.33%	-3.2%
99	166.2	2.5%	$40,611,332	14.3%	$19.64	7.0%	$0.68	1.8%	$1.37	$0.30	$39	22.99%	-1.5%
00	171.8	3.4%	$45,907,371	13.0%	$21.33	8.6%	$0.72	6.0%	$1.39	$0.30	$41	22.85%	-0.6%
01	176.4	2.7%	$51,164,532	11.5%	$23.50	10.2%	$0.77	6.6%	$1.41	$0.30	$43	24.29%	6.3%
02	178.7	1.3%	$52,628,203	2.9%	$23.58	0.3%	$0.76	-1.4%	$1.45	$0.30	$45	23.00%	-5.3%
03	181.7	1.7%	$52,093,296	-1.0%	$23.24	-1.4%	$0.75	-1.3%	$1.43	$0.30	$45	21.74%	-5.5%
04	184.9	1.8%	$54,978,689	5.5%	$24.44	5.2%	$0.77	3.0%	$1.46	$0.30	$47	21.77%	0.1%
05	189.4	2.4%	$58,740,216	6.8%	$25.78	5.5%	$0.78	1.5%	$1.53	$0.30	$51	21.13%	-2.9%
06	194.7	2.8%	$67,542,814	15.0%	$30.81	19.5%	$0.90	15.1%	$1.76	$0.30	$61	22.99%	8.8%
07	201.217	3.3%	$74,765,119	10.7%	$33.89	10.0%	$0.99	9.3%	$1.75	$0.30	$63	24.66%	7.3%
08	**207.254**	3.0%	$79,638,881	6.5%	$35.70	5.3%	$1.03	4.0%	$1.75	$0.30	$65	24.23%	-1.8%

Notes:
1) Does not include ATP passenger revenue.
2) CPI-W figure for FY08 is estimated.

Exhibit 4. Local Economic Trends

Fiscal Year	Tri-County # Of Firms [1]	Percent Change	Tri-County Employment [1]	Percent Change	Tri-County Avg Pay (Earn/Employee)	Wage Inflation	Tri-County Property Value Real Market Value (RMV)	Percent Change	Tri-County Payroll [1]	Percent Change
71	20,867		293,890		$7,779	5.1%			$2,286,036,835	
72	21,213	1.7%	306,931	4.4%	$8,263	6.2%	$7,504,891,116		$2,536,279,969	10.9%
73	21,480	1.3%	325,963	6.2%	$8,817	6.7%	$8,313,206,506	10.8%	$2,874,079,275	13.3%
74	22,666	5.5%	333,393	2.3%	$9,572	8.6%	$9,196,563,014	10.6%	$3,191,334,388	11.0%
75	23,098	1.9%	328,245	-1.5%	$10,256	7.1%	$10,205,290,497	11.0%	$3,366,613,990	5.5%
76	23,796	3.0%	341,909	4.2%	$11,111	8.3%	$11,419,557,678	11.9%	$3,798,781,214	12.8%
77	23,446	-1.5%	362,973	6.2%	$11,859	6.7%	$12,612,056,645	10.4%	$4,304,633,028	13.3%
78	25,203	7.5%	398,591	9.8%	$12,791	7.9%	$14,027,212,577	11.2%	$5,098,305,257	18.4%
79	26,321	4.4%	422,956	6.1%	$13,959	9.1%	$15,897,003,000	13.3%	$5,904,152,731	15.8%
80	26,189	-0.5%	425,451	0.6%	$15,302	9.6%	$18,620,927,000	17.1%	$6,510,203,094	10.3%
81	26,683	1.9%	415,451	-2.4%	$16,488	7.8%	$23,637,223,000	26.9%	$6,850,078,234	5.2%
82	26,274	-1.5%	392,771	-5.5%	$17,413	5.6%	$26,136,442,000	10.6%	$6,839,449,188	-0.2%
83	26,229	-0.2%	390,499	-0.6%	$18,001	3.4%	$28,624,740,000	9.5%	$7,029,388,727	2.8%
84	26,590	1.4%	411,798	5.5%	$18,687	3.8%	$30,559,105,000	6.8%	$7,695,130,126	9.5%
85	26,778	0.7%	422,852	2.7%	$19,193	2.7%	$32,953,204,000	7.8%	$8,115,896,617	5.5%
86	27,373	2.2%	434,908	2.9%	$19,876	3.6%	$34,835,587,000	5.7%	$8,644,381,696	6.5%
87	28,006	2.3%	450,699	3.6%	$20,541	3.3%	$36,354,973,000	4.4%	$9,258,031,450	7.1%
88	28,801	2.8%	479,317	6.3%	$21,469	4.5%	$36,811,010,000	1.3%	$10,290,273,686	11.1%
89	31,088	7.9%	506,533	5.7%	$22,301	3.9%	$37,535,437,000	2.0%	$11,296,147,453	9.8%
90	32,610	4.9%	524,279	3.5%	$23,642	6.0%	$38,864,890,000	3.5%	$12,394,797,852	9.7%
91	33,751	3.5%	523,498	-0.1%	$24,815	5.0%	$42,338,116,000	8.9%	$12,990,643,800	4.8%
92	34,884	3.4%	528,286	0.9%	$26,310	6.0%	$50,366,176,000	19.0%	$13,899,105,282	7.0%
93	36,531	4.7%	547,625	3.7%	$26,968	2.5%	$54,907,907,000	9.0%	$14,768,176,686	6.3%
94	38,490	5.4%	574,868	5.0%	$27,809	3.1%	$59,984,969,000	9.2%	$15,986,609,610	8.3%
95	39,815	3.4%	605,542	5.3%	$29,200	5.0%	$67,435,101,000	12.4%	$17,681,895,017	10.6%
96	41,291	3.7%	625,313	3.3%	$30,965	6.0%	$76,091,671,000	12.8%	$19,362,980,399	9.5%
97	43,788	6.0%	658,099	5.2%	$32,752	5.8%	$86,216,900,000	13.3%	$21,553,852,346	11.3%
98	44,944	2.6%	668,091	1.5%	$34,140	4.2%	$96,630,942,000	12.1%	$22,808,631,870	5.8%
99	44,581	-0.8%	675,109	1.1%	$35,939	5.3%	$106,703,310,000	10.4%	$24,262,566,598	6.4%
00	43,708	-2.0%	691,551	2.4%	$39,169	9.0%	$115,941,283,000	8.7%	$27,087,525,558	11.6%
01	44,810	2.5%	685,125	-0.9%	$39,217	0.1%	$124,350,639,000	7.3%	$26,868,806,752	-0.8%
02	45,719	2.0%	668,540	-2.4%	$39,107	-0.3%	$134,835,692,000	8.4%	$26,144,921,974	-2.7%
03	46,396	1.5%	657,595	-1.6%	$39,999	2.3%	$140,814,040,000	4.4%	$26,303,036,275	0.6%
04	46,931	1.2%	666,703	1.4%	$41,683	4.2%	$151,236,678,000	7.4%	$27,790,186,666	5.7%
05	46,730	-0.4%	691,708	3.8%	$42,663	2.4%	$160,154,351,000	5.9%	$29,510,414,227	6.2%
06	51,262	9.7%	714,362	3.3%	$44,339	3.9%	$171,753,908,000	7.2%	$31,673,975,656	7.3%
07	52,442	2.3%	727,711	1.9%	$46,237	4.3%	$199,710,358,000	16.3%	$33,647,515,297	6.2%
08	**53,491**	**2.0%**	**740,810**	**1.8%**	**$48,145**	**4.1%**	**$213,690,083,060**	**7.0%**	**$35,666,366,215**	**6.0%**

1) Excludes: social services, membership of organization, federal and local government.
2) Boldface figures above are preliminary

Exhibit 5. Ridership and Service (Fixed Route)

Fiscal Year	System Boarding Rides	Percent Change	System Originating Rides	Percent Change	System Originating Rides/Capita	Percent Change	Veh Hours/Capita (Bus & Train Hr)	Percent Change	System Vehicle Hours	Percent Change
71	18,132,600		14,156,400		15.65		0.81		735,000	
72	18,696,600	3.1%	14,607,600	3.2%	15.93	1.8%	0.86	5.9%	789,000	7.3%
73	22,080,600	18.1%	17,258,400	18.1%	18.68	17.2%	0.89	2.8%	818,000	3.7%
74	25,480,000	15.4%	20,550,000	19.1%	22.07	18.2%	0.95	7.6%	887,000	8.4%
75	28,360,000	11.3%	22,690,000	10.4%	24.09	9.2%	1.19	25.1%	1,122,000	26.5%
76	35,210,000	24.2%	28,170,000	24.2%	29.50	22.4%	1.35	13.1%	1,287,000	14.7%
77	38,080,000	8.2%	30,460,000	8.1%	31.46	6.6%	1.40	4.2%	1,360,000	5.7%
78	41,570,000	9.2%	32,630,000	7.1%	32.21	2.4%	1.41	0.6%	1,432,000	5.3%
79	42,250,000	1.6%	33,160,000	1.6%	32.08	-0.4%	1.40	-1.2%	1,443,000	0.8%
80	50,670,000	19.9%	39,760,000	19.9%	37.76	17.7%	1.47	5.0%	1,544,000	7.0%
81	48,090,000	-5.1%	37,740,000	-5.1%	35.54	-5.9%	1.47	0.2%	1,560,000	1.0%
82	46,930,000	-2.4%	36,960,000	-2.1%	34.56	-2.7%	1.51	2.8%	1,615,000	3.5%
83	49,360,000	5.2%	36,520,000	-1.2%	34.52	-0.1%	1.65	9.3%	1,747,000	8.2%
84	49,680,000	0.6%	36,720,000	0.5%	34.36	-0.5%	1.61	-2.4%	1,723,000	-1.4%
85	47,400,000	-4.6%	35,640,000	-2.9%	33.06	-3.8%	1.41	-12.4%	1,522,632	-11.6%
86	45,120,000	-4.8%	33,720,000	-5.4%	31.01	-6.2%	1.39	-1.3%	1,515,504	-0.5%
87	47,880,000	6.1%	35,400,000	5.0%	32.27	4.1%	1.39	0.0%	1,529,136	0.9%
88	46,560,000	-2.8%	35,520,000	0.3%	31.72	-1.7%	1.38	-1.0%	1,545,456	1.1%
89	48,600,000	4.4%	37,440,000	5.4%	32.80	3.4%	1.35	-2.0%	1,544,772	0.0%
90	51,541,000	6.1%	39,661,200	5.9%	33.53	2.2%	1.33	-1.9%	1,570,078	1.6%
91	55,031,000	6.8%	42,311,100	6.7%	34.75	3.7%	1.32	-0.9%	1,602,204	2.0%
92	57,172,000	3.9%	43,996,200	4.0%	35.26	1.5%	1.32	0.1%	1,643,218	2.6%
93	57,198,000	0.0%	44,021,600	0.1%	34.45	-2.3%	1.33	1.0%	1,700,126	3.5%
94	59,148,000	3.4%	45,612,000	3.6%	35.02	1.7%	1.38	3.5%	1,793,292	5.5%
95	61,188,000	3.4%	47,184,000	3.4%	35.50	1.4%	1.38	0.4%	1,837,836	2.5%
96	63,912,000	4.5%	49,248,000	4.4%	36.20	2.0%	1.38	0.0%	1,880,664	2.3%
97	66,780,000	4.5%	51,432,000	4.4%	37.07	2.4%	1.35	-2.0%	1,879,068	-0.1%
98	68,952,000	3.3%	53,100,000	3.2%	37.66	1.6%	1.37	1.4%	1,936,044	3.0%
99	76,309,200	10.7%	59,647,200	12.3%	41.69	10.7%	1.45	5.3%	2,068,284	6.8%
00	81,237,600	6.5%	63,608,400	6.6%	44.04	5.6%	1.49	3.1%	2,152,248	4.1%
01	84,946,800	4.6%	66,484,800	4.5%	45.31	2.9%	1.48	-0.4%	2,177,616	1.2%
02	88,633,200	4.3%	69,367,200	4.3%	46.74	3.2%	1.50	1.3%	2,232,132	2.5%
03	88,863,600	0.3%	69,591,600	0.3%	46.27	-1.0%	1.49	-0.9%	2,241,672	0.4%
04	91,071,600	2.5%	71,284,800	2.4%	46.82	1.2%	1.48	-0.9%	2,249,172	0.3%
05	95,826,000	5.2%	75,014,400	5.2%	48.59	3.8%	1.48	-0.1%	2,278,800	1.3%
06	95,736,000	-0.1%	74,947,200	-0.1%	47.76	-1.7%	1.40	-5.4%	2,192,124	-3.8%
07	96,918,000	1.2%	75,870,000	1.2%	47.40	-0.8%	1.38	-1.3%	2,206,416	0.7%
08	99,230,400	2.4%	77,685,600	2.4%	47.58	0.4%	1.37	-0.9%	2,231,064	1.1%

Exhibit 6. Long-Term Recurring Obligations

Fiscal Year	Debt Services/Capita	Percent Change	Working Capital (in 000's)	Percent Change	Debt Services per Operating Revenue	Percent Change
71						
72						
73						
74						
75						
76						
77						
78						
79						
80						
81						
82						
83	3.23				4.80%	
84	3.49	8.0%	$10,456		5.44%	0.6%
85	3.58	2.6%	$7,995	-23.5%	5.29%	-0.1%
86	2.03	-43.3%	$10,562	32.1%	2.95%	-2.3%
87	2.53	24.7%	$13,789	30.6%	3.46%	0.5%
88	2.25	-11.0%	$10,977	-20.4%	2.92%	-0.5%
89	2.20	-2.1%	$22,571	105.6%	2.68%	-0.2%
90	2.09	-5.2%	$30,124	33.5%	2.41%	-0.3%
91	2.14	2.5%	$38,195	26.8%	2.31%	-0.1%
92	2.07	-3.3%	$41,373	8.3%	2.21%	-0.1%
93	1.90	-8.5%	$44,828	8.4%	1.95%	-0.3%
94	2.40	26.6%	$49,859	11.2%	2.42%	0.5%
95	2.32	-3.4%	$32,800	-34.2%	2.19%	-0.2%
96	3.33	43.6%	$30,528	-6.9%	2.99%	0.8%
97	3.77	13.2%	$35,592	16.6%	2.89%	-0.1%
98	3.65	-3.2%	$56,911	59.9%	2.67%	-0.2%
99	5.91	61.7%	$74,466	30.8%	4.01%	1.3%
00	4.74	-19.7%	$73,289	-1.6%	2.99%	-1.0%
01	6.42	35.3%	$70,170	-4.3%	3.61%	0.6%
02	7.06	10.0%	$86,900	23.8%	3.97%	0.4%
03	6.22	-11.9%	$70,300	-19.1%	3.67%	-0.3%
04	6.82	9.7%	$51,994	-26.0%	3.85%	0.2%
05	9.87	44.6%	$37,100	-28.6%	5.18%	1.3%
06	11.86	20.1%	$22,567	-39.2%	5.74%	0.6%
07	14.11	19.0%	$25,278	12.0%	6.42%	0.7%
08	14.38	2.0%	$62,981	149.2%	6.25%	-0.2%

Exhibit 7. Fixed Route Financial Indicators

Fiscal Year	Operation Costs[1]/Originating Ride	Operation Costs/Originating Ride (Adj. CPI 08)	System Costs[2]/Boarding ride	System Costs/Boarding Ride (Adj. CPI 08)
71	$0.47	$2.44	$0.46	$2.38
72	$0.51	$2.57	$0.50	$2.55
73	$0.49	$2.36	$0.49	$2.36
74	$0.50	$2.19	$0.52	$2.30
75	$0.63	$2.50	$0.66	$2.63
76	$0.77	$2.86	$0.73	$2.71
77	$0.86	$2.99	$0.81	$2.82
78	$0.95	$3.02	$0.88	$2.78
79	$1.07	$3.05	$1.00	$2.84
80	$1.08	$2.67	$1.02	$2.53
81	$1.33	$3.03	$1.22	$2.76
82	$1.48	$3.16	$1.38	$2.95
83	$1.58	$3.32	$1.42	$2.98
84	$1.66	$3.33	$1.47	$2.96
85	$1.68	$3.32	$1.48	$2.94
86	$1.73	$3.41	$1.50	$2.96
87	$1.65	$3.18	$1.44	$2.77
88	$1.76	$3.29	$1.59	$2.97
89	$1.77	$3.15	$1.63	$2.91
90	$1.75	$2.98	$1.65	$2.81
91	$1.74	$2.78	$1.62	$2.60
92	$1.79	$2.73	$1.69	$2.59
93	$1.94	$2.87	$1.88	$2.78
94	$1.99	$2.86	$1.94	$2.78
95	$2.11	$2.93	$2.07	$2.87
96	$2.09	$2.81	$2.02	$2.72
97	$2.12	$2.77	$2.03	$2.65
98	$2.15	$2.75	$2.25	$2.88
99	$2.20	$2.75	$2.17	$2.70
00	$2.36	$2.84	$2.32	$2.80
01	$2.36	$2.77	$2.32	$2.73
02	$2.41	$2.79	$2.39	$2.77
03	$2.51	$2.87	$2.50	$2.86
04	$2.55	$2.86	$2.57	$2.88
05	$2.73	$2.99	$2.71	$2.97
06	$2.83	$3.01	$2.83	$3.01
07	$2.87	$2.96	$2.88	$2.97
08	$2.98	$2.98	$2.99	$2.99

1) Does not includes G&A, ATP, OMAP, Streetcar costs and Medical Plans-Retired/Disabled
2) Does not includes ATP, OMAP, & Service Reimb(if any) costs.

Exhibit 8. Population and Employment Change

Fiscal Year	Tri-County Population	Percent Change	Tri-County Employment[1]	Percent Change
71	904,300		293,890	
72	916,700	1.4%	306,931	4.4%
73	924,100	0.8%	325,963	6.2%
74	931,200	0.8%	333,393	2.3%
75	941,700	1.1%	328,245	-1.5%
76	954,800	1.4%	341,909	4.2%
77	968,200	1.4%	362,973	6.2%
78	1,013,050	4.6%	398,591	9.8%
79	1,033,550	2.0%	422,956	6.1%
80	1,053,100	1.9%	425,451	0.6%
81	1,062,000	0.8%	415,451	-2.4%
82	1,069,300	0.7%	392,771	-5.5%
83	1,057,900	-1.1%	390,499	-0.6%
84	1,068,800	1.0%	411,798	5.5%
85	1,078,000	0.9%	422,852	2.7%
86	1,087,500	0.9%	434,908	2.9%
87	1,097,100	0.9%	450,699	3.6%
88	1,119,700	2.1%	479,317	6.3%
89	1,141,500	1.9%	506,533	5.7%
90	1,183,000	3.6%	524,279	3.5%
91	1,217,560	2.9%	523,498	-0.1%
92	1,247,610	2.5%	528,286	0.9%
93	1,277,820	2.4%	547,625	3.7%
94	1,302,460	1.9%	574,868	5.0%
95	1,329,090	2.0%	605,542	5.3%
96	1,360,530	2.4%	625,313	3.3%
97	1,387,590	2.0%	658,099	5.2%
98	1,409,930	1.6%	668,091	1.5%
99	1,430,650	1.5%	675,109	1.1%
00	1,444,219	0.9%	691,551	2.4%
01	1,467,300	1.6%	685,125	-0.9%
02	1,484,150	1.1%	668,540	-2.4%
03	1,503,900	1.3%	657,595	-1.6%
04	1,522,400	1.2%	666,703	1.4%
05	1,543,910	1.4%	691,708	3.8%
06	1,569,170	1.6%	714,362	3.3%
07	1,600,751	2.0%	727,711	1.9%
08	**1,632,766**	**2.0%**	**740,810**	**1.8%**

1) Employment excludes: social services, membership of organization, federal and local government.
2) Boldface figures above are preliminary

This page left blank intentionally.

Appendix G

C-TRAN Bus Fleet Management Plan

This page left blank intentionally.

C-TRAN Bus Fleet Management Plan

PE Application

September 4, 2008

Title VI

The Columbia River Crossing project team ensures full compliance with Title VI of the Civil Rights Act of 1964 by prohibiting discrimination against any person on the basis of race, color, national origin or sex in the provision of benefits and services resulting from its federally assisted programs and activities.

Americans with Disabilities Act (ADA) Information

If you would like copies of this document in an alternative format, please call the Columbia River Crossing project office at (360) 737-2726 or (503) 256-2726. Persons who are deaf or hard of hearing may contact CRC using Telecommunications Relay Service by dialing 7-1-1.

¿Habla usted español? La informacion en esta publicación se puede traducir para usted. Para solicitar los servicios de traducción favor de llamar al (503) 731-3490.

TABLE OF CONTENTS

List of Figures

List of Tables

Addendum A – Safety Forms

Addendum B – Maintenance Forms

ACRONYMS

ADA	The Americans with Disabilities Act
APC	Automated People Counters
CAD/AVL	Computer Aided Dispatch/Automated Vehicle Locator
CPR	Cardio Pulmonary Resuscitation
CRC	Columbia River Crossing
DHS	Department of Homeland Security
FTA	Federal Transportation Agency
GPS	Global Positioning System
HCT	High Capacity Transit
INIT	Innovations In Transit Corporation
MDT	Mobile Data Terminals
OSHA	Occupational Health and Safety Administration
PTBA	Public Transportation Benefit Area
RTC	Southwestern Washington Regional Transportation Council
TIP	Transportation Improvement Plan
WISHA	Washington Industrial Safety and Health Act

This page left blank intentionally.

Executive Summary

This report summarizes the Bus Fleet Management Plan for C-TRAN of Clark County, Washington. It is intended to meet the requirements of the Federal Transit Administration (FTA) for review under Section 5309 New Starts for the Columbia River Crossing (CRC) Project. This plan articulates the operating environment and the maintenance plans that C-TRAN currently has enacted. There is also an overview of the Safety and Security policies in place. Bus Assignment, Road Call, and other procedures are similarly outlined. C-VAN, the Americans with Disabilities Act (ADA) complimentary paratransit service is also included in all categories. C-TRAN also operates a connector service to small communities located beyond the city limits of Vancouver. Where appropriate, this service is listed separately, but it utilizes the same vehicle types as the C-VAN service and therefore is often included with that service.

This page left blank intentionally.

1. History and Current Conditions

1.1 Brief History

C-TRAN began service in 1981 to provide public transportation in Clark County, Washington. C-TRAN is officially classified as a Public Transportation Benefit Area (PTBA). As such, it is funded by 0.5 percent local sales tax. C-TRAN is governed by a nine-member board of directors selected from elected officials representing the various jurisdictions served by C-TRAN. C-TRAN's service area is 137.14 square miles and has a service area population of 345,110. Ninety three percent of the minority population of the service area lives within 3/4 mile of our fixed route system, according to the 2000 Census data. C-TRAN's service boundary includes the City of Vancouver and its urban growth area and the city limits only of Battle Ground, Camas, La Center, Ridgefield, Washougal, and the Town of Yacolt.

C-TRAN fills an integral role in Clark County, with both fixed route and paratransit services. In addition, C-TRAN also provides some general demand response service (called the Connector), limited stop service, and express commuter service into Portland, Oregon. Every day, tens of thousands of Clark County residents commute to work in Portland. Traffic congestion crossing the Columbia River is a major local issue. C-TRAN runs several commuter routes across both the I-5 and I-205 bridges. Southwestern Washington Regional Transportation Council (RTC) serves as the Metropolitan Planning Organization for the area and oversees the Transportation Improvement Plan (TIP) process.

1.2 Ridership

C-TRAN has seen increases in ridership across all modes of transportation in 2008. A redesigned system plan combined with spiking gasoline prices has resulted in a very transit friendly environment. Recently, C-TRAN opened a new transit center and park and ride Lot with 610 spaces called 99th Street Transit Center at Stokford Village and closed an older transit center called 7th Street Transit Center. A new commuter express route (Route 199- 99th Street Express) was started at the same time. The public has reacted favorably to C-TRAN's infrastructure investment as well as the continuing services as reflected in these ridership charts.

C-TRAN expects a continuing rise in ridership both in Fixed Route and Demand Response.

Figure 1-1. Fixed Route Ridership 2005 to Present

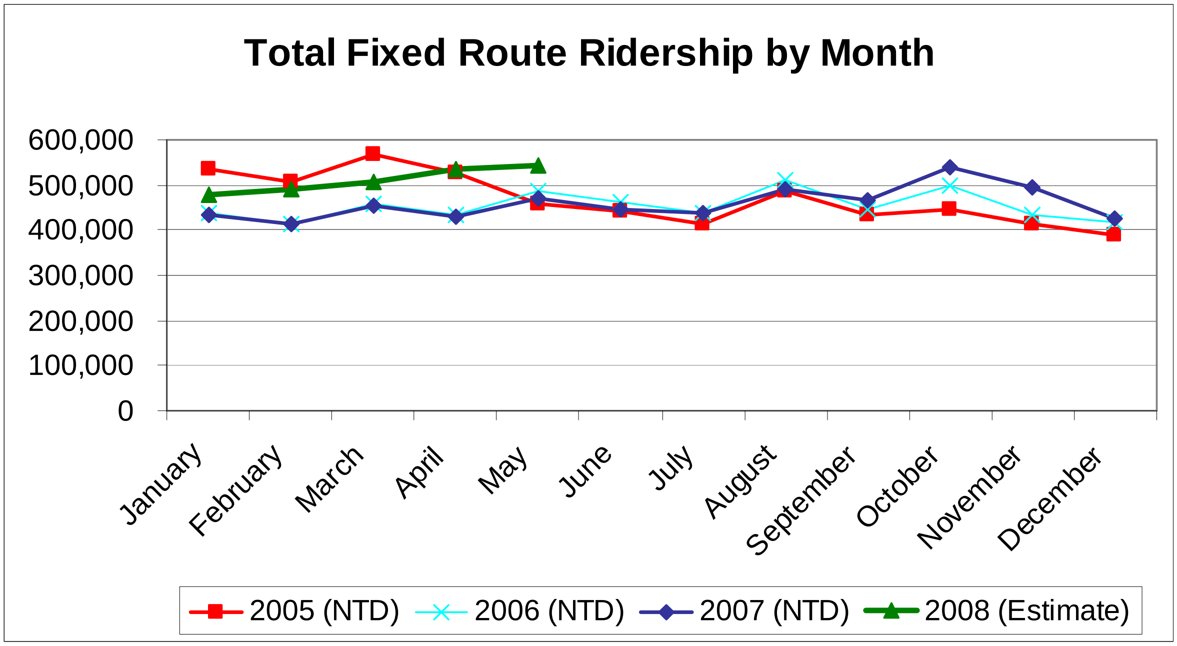
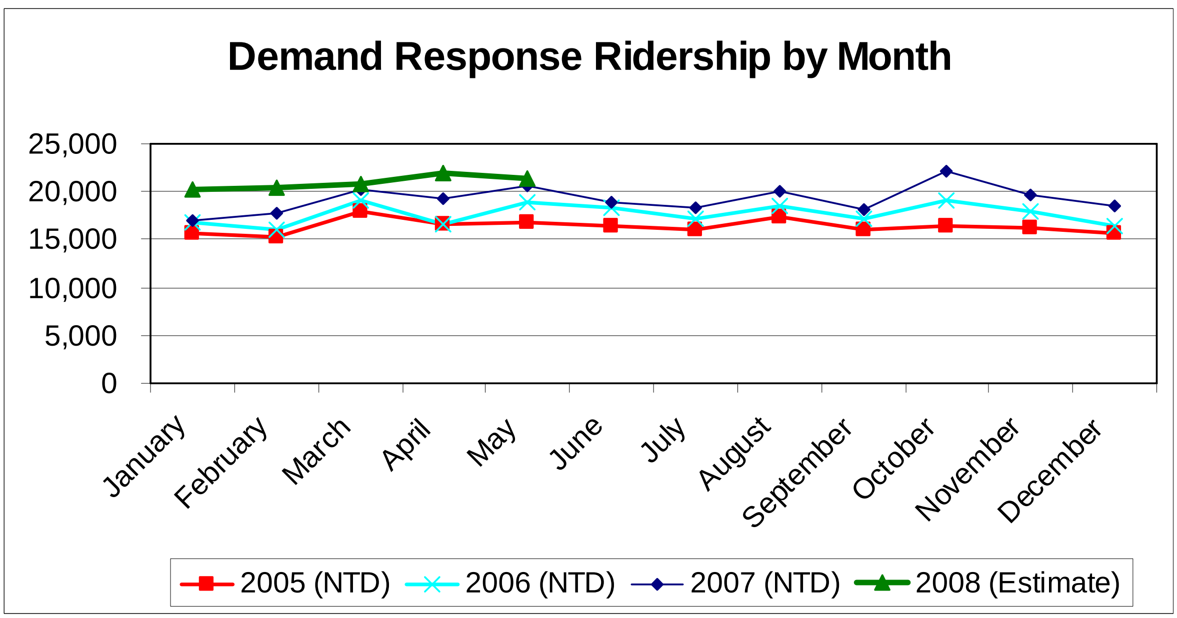


Figure 1-2. Demand Response Ridership 2005 to Present



2. Operational Summary

2.1 Bus Fleet Overview

2.1.1 Fixed Route

The revenue fleet for fixed route service at C-TRAN consists of 110 vehicles in the following categories:

- Fifteen low-floor, 29-foot diesel buses
- Eleven high-floor, 30-foot diesel buses
- Nine high-floor, 35-foot diesel buses
- Five low-floor, 35-foot diesel buses
- Fifty six high-floor, 40-foot diesel buses
- Twelve low-floor, 40-foot hybrid diesel-electric bus
- Two low-floor, 40-foot diesel buses

C-TRAN retains seven buses in its contingency fleet for emergency purposes (not counted in above tally).

2.1.2 Paratransit

The revenue fleet for the C-VAN Paratransit fleet consists of 47 vehicles in the following category:

- Forty seven high-floor, 25-foot diesel buses

The C-VAN fleet is used for shared ride, curb-to-curb service for individuals unable to use fixed route bus service due to disabilities or disabling health conditions. C-VAN does provide limited door-to-door service for clients with special circumstances.

2.1.3 Connector

The revenue fleet for the Connector fleet consists of five vehicles in the following category:

- Five high-floor, 25-foot diesel buses

All vehicles in operation are wheelchair accessible and adhere to ADA compliance standards. Table 2-1, C-TRAN Fixed Route Fleet, provides detailed information on the 110 vehicles used for fixed-route revenue operations. Table 2-2, C-VAN Paratransit Fleet, provides detailed information on the 47 vehicles used for Paratransit operations. Table 2-3, C-TRAN Connector Fleet, provides detailed information about the five vehicles used in the Connector service. Table 2-4, C-TRAN Contingency Fleet, provides information on the vehicles currently assigned to that fleet.

Table 2-1. C-TRAN Fixed Route Fleet (as of August 31, 2008)

Manufacturer-Model	Length	Seats-Standees	Year	# in Bus Fleet
Optima Low Floor	29’	23-10	2004	10
Gillig Low Floor	29’	26-10	2008	5
Gillig Phantom	30’	29-11	1995	11
Gillig Phantom	35’	37-15	1995	9
Gillig-Low Floor	35’	32-15	2008	5
Gillig Phantom	40’	43-20	1995	6
Gillig Phantom	40’	43-20	1999	14
Gillig Phantom	40’	43-20	2002	1
Gillig Phantom	40’	43-20	2003	36
Gillig Low Floor	40’	40-20	1998	2
Gillig Hybrid Diesel-Electric	40’	36-16	2008	12
			Total Fleet Size	111
			Average Age of Bus in Fleet	6.41

Table 2-2. C-TRAN Paratransit Fleet (as of August 31, 2008)

Manufacturer-Model	Length	Seats-Standees	Year	# in Bus Fleet
Ford Eldorado	25’	16-0	1997	13
Ford Eldorado	25	16-0	1999	2
Ford Eldorado	25’	16-0	2004	11
Ford Eldorado	25’	16-0	2006	7
Ford Eldorado	25’	16-0	2007	14
			Total Fleet Size	47
			Average Age of Bus in Fleet	4.95

Table 2-3. C-TRAN Connector Fleet (as of August 31, 2008)

Manufacturer-Model	Length	Seats-Standees	Year	# in Bus Fleet
Ford Eldorado	25’	16-0	1996	1
Ford Eldorado	25’	16-0	1997	4
			Total Fleet Size	5
			Average Age of Bus in Fleet	11.2

Table 2-4. C-TRAN Contingency Fleet (as of August 31, 2008)

Manufacturer-Model	Length	Seats-Standees	Year	# in Bus Fleet
Gillig Phantom	40’	43-20	1995	7
			Total Fleet Size	7
			Average Age of Bus in Fleet	13

2.2 Service Overview

C-TRAN operates five main services: Express Commuter, Limited Stop, Local Fixed Route, Connector, and C-VAN.

C-TRAN has a successful Commuter Express service that serves the Portland, Oregon commuter market. There are 11 routes that operate on various frequencies assisting commuters every weekday. Local Fixed Route Service is operated seven days a week. There are 16 routes involved in local service and an additional four routes that provide weekday Limited Stop Service. The Limited Stop Service provides faster service to riders of the Local Fixed Route Service and also runs to TriMet Light Rail Stations. The Connector service is a general public, demand response service provided so that citizens from outlying areas can have a connection to C-TRAN's other services. C-VAN is the ADA required Paratransit service operated by C-TRAN.

As of July 1, 2008, C-TRAN had the following general operating characteristics:

Table 2-5. C-TRAN General Operating Characteristics (as of July 1, 2008)

	Weekday Span of Service	Weekday Peak/Base Fleet	Saturday Span of Service	Saturday Peak/Base Fleet	Sunday Span of Service	Sunday Peak/Base Fleet
Fixed Route Service	4:45 am-12:30 am	89/56	6:15 am-12:30 am	37/37	6:15 am-12:30 am	28/28
C-VAN Paratransit	4:45 am-12:30 am	42	6:15 am-12:30 am	19	6:15 am-12:30 am	20

C-TRAN's Dispatch and Field Operations office is open seven days a week and is responsible for assigning replacement vehicles when needed in accordance with the available vehicle list from maintenance. C-TRAN maintains a Fixed Route Spare Ratio of 15 percent. Operations hours of service are:

<u>Fixed Route Dispatch</u>

Monday-Friday 3:30 AM until 1:00 AM

Saturday 5:00 AM until 1:00 AM

Sunday 5:30 AM until 1:00 AM

<u>C-VAN Dispatch</u>

Monday-Friday 4:00 AM until 12:30 AM

Saturday 5:30 AM until 12:30 AM

Sunday 6:00 AM until 12:30 AM

Before service operation, all vehicles are given a pre-trip inspection as follows:

- Start-up and all systems check
- Exterior walk-around inspection
- Interior inspection
- Operator’s compartment setup and checks
- Air pressure and brakes check
- Wheelchair lift inspection
- Radio check upon exiting yard
- Wheelchair strap check

Defects found upon completion of the pre-trip inspection are reported to the on-duty dispatcher and recorded on a Vehicle Condition Report. The vehicle is either removed from service or resolved by maintenance when the vehicle is no longer in revenue operation.

2.2.1 Fixed Route (Local and Limited Service)

Local and Limited Stop Fixed Route Service performance is measured against a variety of goals including, but not limited to:

- 27.85 passengers/revenue hour
- 90 percent on-time performance
- $4.05 cost/passenger trip

Express Commuter Fixed Route Service performance is measured against a variety of goals including, but not limited to:

- 27.45 passengers/revenue hour
- 90 percent on-time performance
- $4.24 cost/passenger trip

<u>C-VAN Service</u>

C-VAN performance is measured against a variety of goals including, but not limited to:

- 3.0 passengers/revenue hour
- 95 percent on-time performance
- $35.23 cost/passenger trip

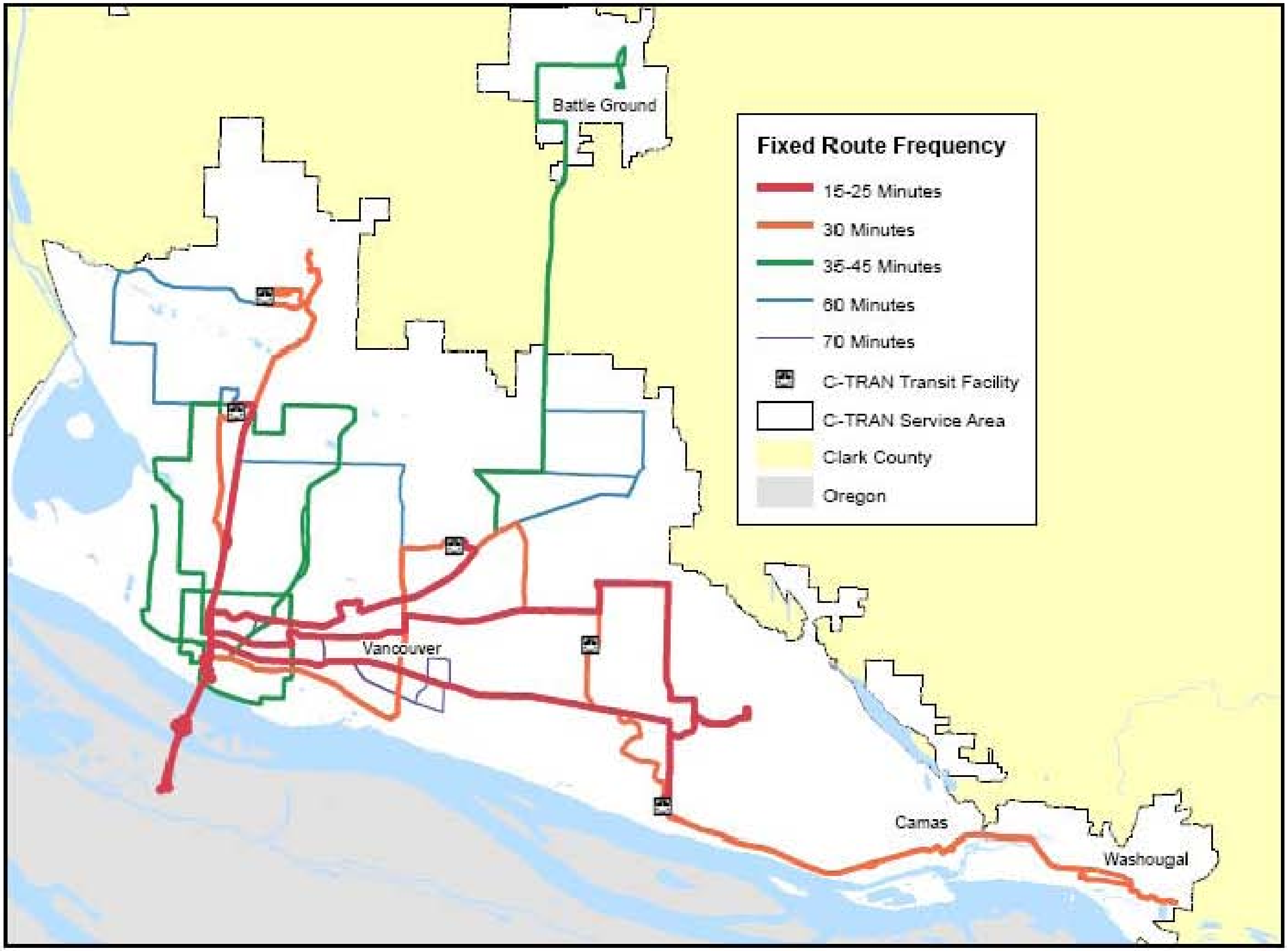
Connector Service

C-VAN performance is measured against a variety of goals including, but not limited to:

- 6.0 passengers/revenue hour
- 90 percent on-time performance
- $15.89 cost/passenger trip

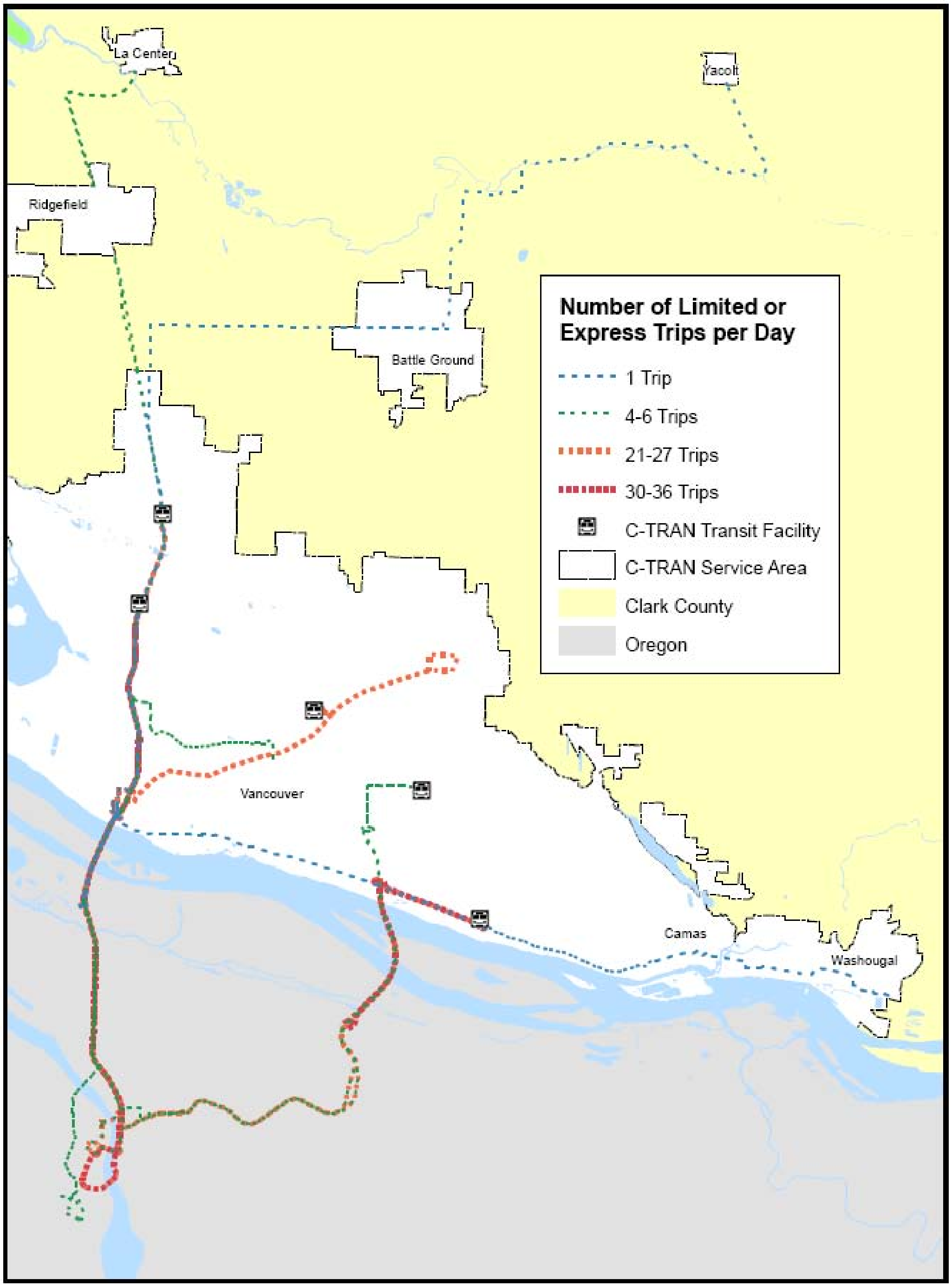
This page left blank intentionally.

Figure 2-1. Local Service Fixed Route Frequency



This page left blank intentionally.

Figure 2-2. Commuter and Express Fixed Route Service



This page left blank intentionally.

2.3 C-VAN Service Overview

C-TRAN provides Complementary Paratransit service as required by the Americans with Disabilities Act (ADA). The complementary Paratransit service is called C-VAN. C-VAN is a shared-ride public transportation service for people who are unable to use buses due to a disability or disabling health condition. C-VAN operates during the same hours as bus service.

The boundary of the C-VAN service area is 3/4 mile from the outermost portions of the fixed route bus system including all locations inside that boundary, except for areas that are not part of the C-TRAN service district. C-VAN operates all of its own service and maintenance is provided by C-TRAN. All rides are by advance reservation only and must be requested no later than 5 p.m. the day before the trip on weekdays and 4 p.m. on weekends.

C-VAN service fares are $1.30 for a one zone one-way pass and $2.35 for an all zone one-way pass per boarding. A C-VAN monthly pass is available for $23.00.

Operating costs of the C-VAN service in 2007 increased approximately 50 percent compared to 2005. In 2007, ridership increased 15.8 percent compared to 2005. The cost of a one-way ride on C-VAN (as of Dec. 31st, 2007) was approximately $35.10.

C-VAN is projecting ridership increases of over 10% for the current year.

Table 2-6. Historical, Current, and Future C-VAN Fleet Needs

Year	C-VAN Vehicles
2004	42
2005	42
2006	42
2007	47
2008	47
2009	47
2010	47
2011	48
2012	49

2.4 Contingency Fleet Plan

The purpose of C-TRAN's Contingency Fleet Plan is to provide guidelines for a contingency bus fleet as part of the total C-TRAN operating fleet in accordance with Federal Transportation Administration (FTA) policies. FTA Circular 9030.1A sets forth its policy permitting transit agencies to place buses in an inactive contingency fleet for future emergency use in lieu of disposition.

Contingency Fleet - the buses held in the contingency fleet are for emergency operations (evacuation), energy shortages, or replacement of buses in the active fleet. Buses in the contingency fleet have reached the end of their normal minimum useful life in accordance with FTA policies.

- A standard-sized, heavy-duty bus (35-40 feet) must be in service 12 years or have traveled more than 500,000 miles.
- A medium-sized, heavy-duty bus (30 feet) must be in service 10 years or have traveled more than 350,000 miles.
- A small, medium-duty bus (under 30 feet) must be in service 7 years or have traveled at least 200,000 miles.
- Other vehicles such as regular and specialized vans must be at least 4 years old or have traveled more than 100,000 miles.
- In the case of a rehabilitated bus, it will have been in revenue service in excess of 5 years from the date of rehabilitation.

C-TRAN will have seven standard-sized buses in its fixed route contingency fleet as of August 31st, 2008. This represents a current ratio of 6.4 percent of the total active fixed route bus fleet and 0 percent of total demand response active bus fleet. A contingency fleet is to protect against the many variables which could require that some or all of these stored buses be quickly placed back into regularly scheduled service. This objective will be met as older buses are replaced and reassigned from the active to the contingency fleets. The following highlights some of the reasons that a contingency fleet is felt to be justified:

2.4.1 Unanticipated Surge in Ridership

A sudden, unanticipated increase in bus ridership could require that a corresponding increase in the level of bus service be implemented. Such a ridership increase would most likely occur as a result of an energy-related emergency. However, a similar situation could occur due to a major transportation corridor construction project (causing extreme delays) or the failure of a major transportation facility such as a river crossing. Although it may be of shorter duration, ridership increases could result from major weather-related events such as an ice/snow storm or special service events requiring expanded bus service.

2.4.2 Bus Availability

An event that would require major bus fleet expansion may well be national in scope (an energy crisis, for example). Consequently, many transit agencies may be attempting to procure additional buses at the same time. This could result in long lead times to purchase, which would be prohibitive in terms of responding to the crisis. New technology in support of the Clean Air Act of 1990 could also contribute to long lead times in receipt of new equipment. Thus, a contingency fleet would be imperative.

2.4.3 Storage, Maintenance, and Funding

The contingency fleet will be stored on site to ensure security and allow ready access to the fleet. In addition, these vehicles will be placed on a 90-day preventative maintenance cycle. On-site storage allows this to occur with little disruption to routine preventative maintenance processes. Periodic start-ups will occur between normal preventive maintenance inspections so the fleet remains ready for service at all times. All records associated with these vehicles will be maintained in the vehicle-history file. C-TRAN has developed its contingency fleet from its current, existing fleet. Ongoing operational and maintenance costs will be funded through the agency’s annual operating budget.

This page left blank intentionally.

3. Maintenance

3.1 Current Maintenance Staffing

C-TRAN maintenance employees operate on a 24-hour, 7-day/week work schedule. All shifts are staffed to accommodate scheduled preventive maintenance and fleet modifications as well as unscheduled repairs when vehicles are out of operation. C-VAN maintenance is also done in the same facilities as the fixed route service and by the same maintenance staff. Therefore, C-VAN maintenance procedures and statistics are included in this chapter as well. Table 3-1, C-TRAN Maintenance Budgeted Staff Levels, illustrates the number of employees in each job classification.

Table 3-1. Maintenance Budgeted Staff Levels

Position	#
Director of Maintenance	1
Fleet Maintenance Manager	1
Fleet Maintenance Supervisor	3
Janitor/Hostler – Full time	1
Janitor/Hostler – Part time	5
Vehicle Service Worker	9
Preventive Maintenance Worker – Tire	1
Preventive Maintenance Worker - Lube	3
Lead Mechanic	3
Mechanic	9
Apprentice Mechanic	3
Coach Technician	2
Coach Technician- Apprentice	1
Maintenance Training Supervisor	1
Facility Maintenance Manager	1
Lead Facility Maintenance Worker	1
Facility Maintenance Worker	3
Facility Service Worker	4
Facility Helper	1
Inventory Supervisor	1
Inventory Analyst	1
Inventory Technician	4
Total Employees	59

The five positions labeled as “Janitor/Hostler – Part time” are part of a supported work program sponsored by C-TRAN. The personnel holding these positions all have either a physical or developmental disability. They are brought on staff to provide cleaning services while helping them to become self-sufficient and learn important life skills.

3.2 Scheduled Preventive Maintenance

The emphasis of Preventive Maintenance is on preventive rather than reactive maintenance. The preventive maintenance program has effectively reduced overall maintenance costs by decreasing the number of road calls and the high cost of unpredictable maintenance activity. In C-TRAN's case, where the average age of the fixed route fleet is 6.41 years, the prevention of increasing maintenance expense related to an aging fleet necessitates a strong preventive maintenance program in order to be successful at controlling costs.

The preventive maintenance program schedules the inspection of buses based on a variety of categories. This is dependent upon usage and fleet type. The schedule is progressive in that each level of inspection includes a higher level of maintenance inspection activity. Vehicles receive an inspection based on fleet type, mileage, and time, along with annuals. All preventive maintenance programs follow, at the least, the minimum guidelines and requirements recommended by the manufacturers, suppliers, or builders.

Certain components such as video cameras and Automated People Counters (APCs) do not have a preventative maintenance cycle. Such specialized equipment either works or it doesn’t, there are no moving parts to maintain. Maintenance is alerted to any failures and either repairs or replaces the components as needed. Each sub-fleet has its own specific PM schedule, as outlined below.

3.2.1 Fixed Route Coaches

These coaches are inspected/serviced every 3 months/6,000 miles, based on the manufacturer's recommendations and oil sampling results.

- 6,000 Inspection/A Service: Safety inspection, proper operation and functions, steam cleaned, brakes and adjustment check, lubrication, inspection of interior, operating controls, exterior, batteries, undercarriage, engine compartment, transmission, motor guard system, brake efficiency, and road tested. Change engine oil and filters.
- 12,000 Inspection/B Service: 6,000-mile service, service transmission, replaces fuel and coolant filters, plus minor extras.
- 18,000 Inspection/C Service: 6,000-mile service.
- 24,000 Inspection/D Service: 6,000-mile service, service transmission, replace fuel, coolant, hydraulic, and air filters, plus minor extras.
- 24,000 Miles: Wheelchair major inspection.
- 30,000 Inspection/E Service: 6,000-mile service.
- 36,000 Inspection/F Service: 6,000-mile inspection, service transmission, replaces fuel and coolant filters, plus minor extras.
- 36,000 Transmission Service – Voith (tracked separately)

- 42,000 Inspection/G Service: 6,000-mile service.
- 48,000 Inspection/H Service: 6,000-mile service, take engine, transmission, and differential oil samples, service transmission and differential, replace fuel, coolant, hydraulic, and air filters, plus minor extras.
- 50,000 Miles: Major inspection and service for engine, air suspension, and chassis systems.
- Annual air-conditioning service.
- Annual farebox service.
- Annual emissions testing.

3.2.2 Demand Response and Fixed Route Cutaways

These vehicles are inspected/serviced every 3 months/5,000 miles, based on the manufacturers recommendations and the results of long term oil analysis and oil sampling results.

- 5,000 Inspection/A Service: Safety inspection, proper operation and functions, steam cleaned, brakes and adjustment check, lubrication, inspection of interior, operating controls, exterior, batteries, undercarriage, engine compartment, transmission, motor guard system, brake efficiency, and road tested. Perform chairlift maintenance. Change oil and filters.
- 10,000 Inspection/B Service: 5,000 mile service, plus replace secondary fuel filters.
- 15,000 Inspection/C Service: 5,000 mile service.
- 20,000 Inspection/D Service: 5,000 mile service, change transmission oil and filter, change differential oil, replace both fuel filters, replace air filter, flush hydraulic system, plus minor extras.
- 24,000 Miles: Wheelchair major inspection.
- 25,000 Inspection/E Service: 5,000 mile service.
- 30,000 Inspection/F Service: 5,000 mile service, replace secondary fuel filter.
- 35,000 Inspection/G Service: 5,000 mile service.
- 40,000 Inspection/H Service: 5,000 mile service, change transmission oil and filter, change differential oil, replace both fuel filters, replace air filter, flush hydraulic system, take engine oil sample, take transmission oil sample, plus minor extras.
- Annual air conditioning service.
- Annual emissions testing.

3.2.3 Staff/Support Vehicles

- Staff and support vehicles are inspected/serviced every 3 months/3,000 miles based on manufacturers' recommendations and results of oil analysis. Shop equipment service inspections are based on hours of operation and are scheduled on hours/months which can vary depending on equipment.

- 3,000 miles/3 months Inspection: Service inspection of all safety items, major functions, oil changes, lubrication, and oil samples are taken.
- Annual air conditioning service.
- Annual inspection of emission pollution control systems are completed along with a state required emissions testing of tailpipe pollutants.
- These services are tracked by computer and a log sheet is maintained by the service worker.
- See attached service schedule and log sheet.

3.3 Preventative Maintenance on ADA Components

Preventive Maintenance has always been and will continue to be the focal point of the Maintenance Department's philosophy in assuring that transportation equipment and accessories, both for Revenue and Paratransit service, are in proper working order and condition. This is especially true for the ADA components. Vehicles need to be fully functional to provide the level of service the public expects.

Fleet Maintenance Supervisors oversee mechanic and service workers daily workloads and monitor equipment performance to assure proper scheduling of preventative maintenance and repairs to optimize efficiency. Basic maintenance criteria are initially based on manufacturer's recommendations and industry experience. Adjustments to techniques, procedures, and time intervals between services are made as needed to compensate for wear rates on equipment based on cycling intervals, usage, and commitment to service needs. It is the philosophy of the agency that when an accessibility feature on a vehicle that is in service is deemed inoperable, it is to be removed from service as soon as feasibly possible.

The following is an outline of the service preventative maintenance scheduling as of 1994:

<u>Wheelchair Lifts, Lift-U</u>

- <u>Every 6,000 Miles Minor Service</u>: Pressure wash slide rails, inspect and lubricate critical wear points, operate and test safety devices to assure proper operation.
- <u>Every 24,000 Miles Major Service</u>: Pressure wash slide rails, inspect and lubricate critical wear points, adjust chains and proximity\limiting switches, replace damaged sensitive pressure mats and edges, test fluid pressures and replace oil filter.

<u>Wheelchair Lifts - Cutaways</u>

- <u>Every 6,000 Miles Minor Service</u>: Inspect, lubricate and perform operational test to confirm proper operation.
- <u>Every 24,000 Miles Major Service</u>: Clean, inspect, lubricate, adjust, and repair broken loose parts. Perform test on all safety systems and repair as needed.

Kneeling Systems

- Every 6,000 Miles Minor Service: Inspect front suspension components including air springs, radius rods and skinner valves, warning alarms (when applicable) and electric controls. Lubricate components and test for proper operation of kneeling system and brake interlock.
- Every 50,000 Miles Major Service: Inspect for and repair worn suspension components, adjust ride height and kneel height, adjust\repair cycle rates, adjust\repair kneel operation lock-out and brake interlock safety feature, adjust front suspension alignment to manufacturer's specifications.

Wheelchair Restraints

- Every 6,000 Miles: Inspect wheelchair tie-down mounting and lock strips for proper securement, inspect tie down straps and belts for proper operation, free of sharp edges, fraying and ease of operation. Inspect accessible seating for proper securement, latching and operation.

Public Address System

- Every 6,000 Miles: Inspect and operate system to assure proper performance.

Passenger Signal Chimes

- Every 6,000 Miles: Inspect and operate system to assure proper performance.

3.3.1.1 On Route Failures

Upon discovery that there is a mechanical or electrical failure on a wheelchair lift or ramp, the vehicle will be promptly removed from service. If the Operations Department does not have the resources available to make the exchange then the shop will use its resources to make the vehicle exchange.

Any vehicle equipped with a wheelchair lift or ramp that has a mechanical defect or failure of one of its safety systems will not be put into service until a proper and permanent repair is made. It will be the shops' responsibility to inspect, repair, or deadline any vehicle that is found to have a wheelchair or ramp problem at the time of pre-trip by the Coach Operator.

3.4 Unscheduled Maintenance

Unscheduled maintenance is classified into four categories: Road Calls, Pullout Repairs, Operator Reported Defects, and Unit Repairs.

- Road Call Repairs: A disruption of service where another vehicle must be put into service to replace the disabled vehicle for mechanical or safety concerns.
- Pullout Repairs: Problems with a vehicle, typically minor mechanical or safety issues that are found by the operator and must be fixed before the vehicle is put into service.

- Operator Reported Defects: Problems with a vehicle that do not warrant a disruption of service and are mainly comfort, cosmetic, or minor mechanical issues.
- Unit Repairs and Rebuilds: C-TRAN's Maintenance staff and facility maintains the ability to do extensive repairs and rebuilds of essential components. In addition to major components such as engines and transmissions, C-TRAN rebuilds many smaller components such as alternators, starters, AC compressors; rear-end differentials, and steering boxes. C-TRAN is also a full service body shop that can perform all of its own body work including frame straightening and painting in the paint shop. C-TRAN does not have any tow trucks on site, but does have three service trucks. One is used for building and grounds maintenance. One is used for revenue vehicle servicing. The remaining vehicle can be used for either purpose.

3.5 Cleaning and Fueling Program

At C-TRAN, it will be the responsibility of all Vehicle Service Workers to ensure that the cleaning and fueling of all vehicles are completed on schedule and to record all defects on a Vehicle Condition Report and report them to the supervisor. If at any time a defect is noted that renders a vehicle unserviceable, then Vehicle Service Workers should complete a Vehicle Condition Report on defect, and then immediately notify the supervisor on the status of the vehicle.

There are four different areas that are addressed in the following procedures. All of the cleaning procedures require the use of an inspection check sheet while performing your duties. The fueling procedures require following a basic guideline with no inspection check sheet used in the process. Vehicle Service Workers are responsible for following these guidelines from start to finish. Although an inspection check sheet is not required to complete the fueling process, a check list is posted at the fuel island for viewing.

3.5.1 Fueling Procedures

1. Install seat cover and steering wheel cover.
2. Do a vehicle walk-around inspection:
   a. Check all lights and note defects.
   b. Check all tires for damage and obvious low air pressure. Note defects.
   c. Inspect entire vehicle for physical damage. Note defects and report them to a Fleet Maintenance Supervisor immediately.
   d. Lift engine compartment cover and note whether the hood light operates. Prop the hood open at this time. Perform an engine-compartment inspection at this time.
3. Make engine compartment checks
   a. Check the engine oil. Adjust engine oil level as needed, secure dipstick.

   b. Check antifreeze level in expansion tank. Note defects.
   c. Visually check brake fluid level. Note defects.
   d. Check washer fluid level and fill if needed.
   e. Visually inspect all engine belts for cracks, exposed cords, or any other defects. Note defects.
   f. Visually inspect engine compartment for obvious defects. Note defects.
   g. Visually check power steering fluid, top off as needed. Secure dip stick.

4. First set parking brake and then start vehicle.
5. Turn on all lights, i.e., headlights, park lights, four-way lights, interior lights, and any other lights with which the vehicle is equipped. Inspect for proper operation.
6. After the vehicle is positioned for fueling set the park brake and release the hood. Check transmission oil, top off as needed. Secure dip stick and shut down engine. Turn off all lights.
7. Enter the appropriate information into the fuel system and start fueling the vehicle. Record vehicle mileage.
8. Inspect vehicle interior for trash, check the ashtray, under the seat, and the glove compartment. Replace the plastic trash bag with a new one if used. The onboard camera system should be checked at this time.
9. If interior needs vacuuming, do so at this time.
10. Inspect trunk area for trash and clean as needed. Secure trunk lid.
11. Fueling should be complete by this time. Remove the nozzle and secure the fuel cap.
12. Return vehicle to its assigned parking space and secure.
13. Remove seat and steering wheel covers and report noted defects to a Fleet Maintenance Supervisor or Lead Person.
14. Turn all loose, personal items into Dispatch as lost and found. Indicate from which vehicle items were found by attaching sticky notes to the items (if possible).

3.5.2 Cleaning Procedures

Before beginning cleaning procedures, ensure that vehicle is not scheduled for use. Complete out-of-service notification tag and procedure. Notify Dispatch with tag. Pull vehicle keys for use.

Attention: Before moving a staff, vanpool, or support vehicle, a steering wheel and seat cover will be put in place. A plastic cover for both areas has been provided for use, both at the fuel island and in the shop.

1. Spot Clean: There will be three spot cleans to every major clean done. This cleaning process will be performed once a week.

2. Major Clean: There will be one major clean to every three spot cleans. This cleaning process will be performed every fourth week.

3. Special Clean: This cleaning process will be performed anytime a vehicle is scheduled to be used under special request. When this process is used, it will be recorded under major clean with an asterisk (*) indicating that it was done under a special request.

Each cleaning requires using a check-off list when performing specific duties. After completing the inspection sheet, it is required to record the type of cleaning completed, date work was done, and employee's initials in Cleaning Records book. After completing the above procedures, return to Dispatch with vehicle keys, if applicable. Remove the out-of-service notification tag from the vehicle' assigned key location. Return keys to key location which indicates that the vehicle is now back in service and ready for use.

3.6 Maintenance Facilities

Fleet and facility maintenance is centered on C-TRAN's only garage located at 2425 NE 65th Avenue in Vancouver, Washington. It is also the vehicle storage facility for all vehicles.
C-TRAN has a total of 169 vehicles that represent different sizes, makes, and models of vehicles needed. All service vehicles start and end each service day and receive all necessary maintenance at this garage.

Bodywork is performed at this facility as well, which is equipped and staffed to repair accident damage, body defects, and paint. C-TRAN does its re-builds and engine overhauls at this facility. The current facilities were completed in 1983.

4. Bus Fleet Management

4.1 Safety Policy

Orientation of new employees, rehires, part-time employees and those transferred from another department within the organization will begin the first day of employment on the new job. This program will provide an introduction of company/department policies and rules and will include a thorough safety briefing. The orientation should include a tour of the facilities to acquaint the employee with the entire operation. The employee should also be advised how the safe performance of his/her job is important to the overall operation of C-TRAN.

The immediate supervisor of the employee, or his designated representative, will thoroughly instruct him/her in job safety requirements. The form “Safety Orientation Checklist” is provided for this purpose. The checklist must be completed by checking each item as it is covered, signed by the supervisor and employee, and returned to Human Resources for placement into the employee’s file. The “Employee Responsibility List” will also be reviewed with the employee by the supervisor or Risk Specialist.

The supervisor will tell, show, and then let the employee do the job under close observation. The supervisor should continue to check back frequently to see that proper work methods, including safe practices, are being followed.

GENERAL SAFETY RULES

The following safety rules should be followed by all employees:

1. Observe “No Smoking” areas and other warning signs.
2. Walk... do not run... use special caution when walking on wet surfaces or while going up or down stairs.
3. Wear sensible non-skid shoes, no slippers, thongs, or other unsafe footwear may be worn at work.
4. Do not wear frayed, torn or loose clothing, jewelry, or long, unrestricted hair near moving machinery or other sources of entanglement, or around electrical equipment.
5. Horse play, scuffling, and playing of practical jokes, throwing objects, etc., is prohibited.
6. Report any potential accident-producing situation to your supervisor immediately.
7. Do not remove or render ineffective, any guard except for repair. In such cases, equipment must be disconnected at the main power disconnect and clearly marked before the machine guard is removed.
8. All safety devices must be used without exception, make sure the guards are in place before starting any equipment.

9. Before starting repair work on any equipment, the switch or valve controlling its power source must be off and clearly marked.
10. Keep your work area clean and picked up.
11. When lifting, you should keep your back straight. The object does not have to be heavy to cause back strain if you reach out too far to lift, or if you try to lift with a bent back. Keep the center of gravity of the object close to the body and lift smoothly with feet planted firmly. Get down to the load by bending your knees. Use the strong leg and abdominal muscles instead of the muscles of the lower back. Do not jerk or twist while making the lift. If the load is too heavy, **ASK FOR HELP!**
12. See that all hand tools that are used are maintained in good condition. Defective tools should be repaired or taken out of service promptly.
13. All electrical hand tools should be properly grounded.
14. Keep all floors and aisles clear of material.
15. Before using a ladder, check to see that it has safety feet and is free from cracks, broken rungs, or other defects.
16. Use compressed air only on the job for which it is intended. Do not engage in horse play. A highly compressed stream of air flowing through a very small opening can pierce the skin and cause severe and very painful injury.
17. Learn the location of all fire exits, alarm boxes, and extinguishers in your department.

Ongoing safety education programs will be provided for all employees in an effort to increase awareness of accident-causing factors; to improve team spirit; and to promote acceptance of safety rules by presenting accident prevention as a positive, desirable and integral part of all activities. Supervisors will provide a systematic accident prevention program for the employee. This program will provide on-the-job training in the employee’s work area and will familiarize each person with company safety requirements. Specific training will be provided for certain jobs and types of equipment. First aid and CPR training and certification will be required for all lead persons, supervisors, or persons in direct charge of crews in order to assure that all employees can be afforded quick and effective first aid in the event that an injury occurs on the job.

To afford the employee immediate and effective attention should an injury result, the Director of Administrative Services will ensure that certified first aid personnel will be available. Other persons will be trained as designated by management to surpass or augment the standard requirements which will include all designated building wardens. Valid First Aid certificates are recognized as ones which are less than 3 years old. Annual cardiopulmonary resuscitation (CPR) training is required in addition to the regular first aid training, if a first aid course does not combine the two subjects.

First aid kits will be in accordance with the requirements of the General Safety and Health Standards. First aid kits are located in each C-TRAN location and in each transit vehicle. All first aid kits are properly maintained and restocked on a regular basis. The Safety Bulletin Board is another method used by C-TRAN to increase employee awareness of safety and health, and communicate management's safety message. Safety Bulletin Boards are posted in designated, highly visible areas and dedicated exclusively to the posting of safety related material.

The following items are required to be posted:

1. WISHA Poster, LI-416081.
2. Industrial Insurance Poster, LI-210-191.
3. Citation and Notice (as appropriate).
4. OSHA 200 Summary (specifically during month of February).

The following programs are examples of major safety programs currently being implemented at C-TRAN:

- Personal Protection Equipment Program.
- Hearing Conservation Program.
- Respirator Awareness Program.
- Lock Out/Tag Out Program.
- Hazardous Communications Program/An Employee's Right to Know.
- Blood Borne Pathogens Exposure Control Plan.
- Quarterly Facility Safety Inspections.
- On The Job Injury Reporting.

4.2 Security Policy

C-TRAN's security policy is that all employees and customers serve as the "eyes and ears" of security awareness and reporting. By encouraging the customers to report incidents and hazards, we decrease the ability of a criminal or anyone else to act undetected. It is impossible for C-TRAN or any transit agency to place all areas under observation at all times, however, our customers are often present when agency personnel are not. Security procedures assure rapid communication and response to a reported security situation. C-TRAN's Operation and Dispatch Center works with local 9-1-1 dispatch to permit the fastest possible police or emergency response.

C-TRAN buses have security cameras on-board and public telephones are installed at transit center platforms to call 9-1-1. There are also cameras installed at the Fisher's Landing Transit Center and the 99th Street Transit Center. Contracted Transit Security Officers, and Field Supervisors, patrol along our route system and our physical facilities. All revenue service vehicles possess Global Positioning System (GPS) equipment that pinpoints its exact location. This allows all vehicles to be tracked in real time and can assure a rapid response should an operator not be able to provide their location for any reason.

C-TRAN receives information about homeland security threats potentially affecting transit systems through emailed Department of Homeland Security (DHS) Daily Open Source Infrastructure Reports and various other sources. Agency personnel then take the appropriate action. C-TRAN has adopted transit agency best practices and training related to domestic security, which all operating personnel have been trained on. We continually monitor emerging trends in mass transit security and homeland security.

4.3 Quality of Service/Performance Monitoring

Market research shows that transit service must be reliable in order to be a viable alternative transportation choice. This is achieved by writing accurate schedules; minimizing the time buses are delayed by traffic congestion; efficient boarding and fare payment systems; proper training and supervision of drivers; and restoring service promptly after a disruption. All coach operators under go customer service training in order to provide a higher level of service.

A key component to maintaining high quality service is having a strong performance monitoring program in place. C-TRAN is also in the process of adopting an upgraded set of service standards. The recently installed Computer Aided Dispatch/Automated Vehicle Locator (CAD/AVL) system is introducing a new level of data access and reporting. So the performance monitoring program and the service standards are being updated to reflect this change.

4.4 Vehicle Deployment Standards

C-TRAN deploys vehicles in the fixed route service on the basis of a variety of factors. Those factors include, but are not limited to:

- Average daily ridership.
- Size of vehicle.
- Headway frequency.
- Availability of sidewalks.

Table 4-1. Coach Assignment Table

Route #	Route	Coach Assigned
2	Lincoln	29’
3	City Center	29’
4	Fourth Plain	40’
7	Battle Ground	29’
9	Felida	30’
19	Salmon Creek	30’
25	Fruit Valley/St. Johns	30’
30	Burton	35’
32	Evergreen-Andresen/Hazell Dell Avenue	30’-35’
37	Mill Plain/Highway 99	40’
39	Clark College/Medical Center	29’
41	Camas/Washougal Express	40’
44	Fourth Plain Limited	40’
47	Battle Ground Limited	29’-30’
65	Parkrose Limited	35’
72	Orchards	29’
78	78th Street	29’
80	Van Mall/Fisher’s	30’
92	Camas/Washougal	30’
105	I-5 Express	40’
134	Salmon Creek Express	40’
157	Lloyd District Express	40’
164	Fisher’s Landing Express	40’
177	Evergreen Express	35’-40’
190	Marquam Hill Express	40’
199	99th Street Express	40’
varies	Connector Service	25’

In many older areas, sidewalks are not present. In order to provide service in these areas to the disabled community, C-TRAN has many lift-equipped vehicles. The majority of vehicles assigned to fixed route service are high floor, lift equipped vehicles and the rest are ramp equipped low floor buses.

4.5 In-Service Repairs/Road Calls

In the event that a revenue vehicle in operation has a maintenance failure, C-TRAN's policy is straight forward. The operator will contact maintenance. C-TRAN has a dedicated radio channel for this purpose. A mechanic will then try to assist the operator with correcting the fault over the radio. If the fault is not fixed and it is not safety- or ADA-related, the revenue vehicle will stay in service. However, if the fault is safety- or ADA-related, the operator must be able to correct the fault before continuing. If the operator cannot correct the fault, then maintenance will contact dispatch and arrange for a replacement vehicle to the operator's location.

4.6 Route Design – Fixed Route

C-TRAN service is designed to meet ridership demands while maintaining a high level of service efficiency. C-TRAN recently underwent a major revision and re-alignment of fixed route service in November of 2007. This process was undertaken to provide better service in the heavily used corridors and to maintain on-time performance.

An important component to maintaining this efficiency is in designing service schedules to meet the varying demand levels for service throughout the day. The basic variable that gives service planners this flexibility is altering service headways throughout the day. However other variables such as span of service, inter-lining bus trips, and offering peak-only service can improve the efficiency of service on the street.

A bus is considered on time if it arrives no more than 1 minute early or 5 minutes later than its scheduled arrival time. Information on bus arrival times is continually collected and summarized. The goal is for at least 90 percent of all bus trips to arrive at time points on time during an average Weekday, Saturday, or Sunday. Currently, C-TRAN has an on-time performance rating of 97 percent.

4.7 Technology Upgrades

C-TRAN recently implemented the first phase of a Computer Aided Dispatch/Automated Vehicle Locator or "CAD/AVL" project. The vendor on this project was "Innovations In Transit Corporation" (INIT). The first phase was the initial installation of the basic system. This included the installation of vehicle based Mobile Data Terminals (MDTs), computer software/hardware, Automated Passenger Counters (APC), and system training for both operators and support staff. Future phases of this project will involve Automated Stop Announcements, installing electronic signage at transit centers, and switching from radio towers to cellular technology. C-TRAN staff is currently working with the vendor to resolve various installation issues such as radio "dead spots" and also getting the APC system certified by the FTA. So that Section 15 counts can be automated.

C-TRAN is also installing the FA Suite fleet maintenance management software system with full integration into new Finance and Administration systems greatly enhancing transit agency cost accounting and human resource functions. It will allow the maintenance department a much higher level of cost control than the old system. It will also vastly improve communications between Maintenance and other C-TRAN departments. The system will be almost completely paperless and allow for mobile wireless inputs with real-time capture of data related to repairs and labor utilization.

This page left blank intentionally.

5. Future Growth

5.1 Columbia River Crossing

The Columbia River Crossing Project is one of the single most important public works projects to happen in decades. Population growth, traffic congestion, and freight traffic make the completion of this project imperative. The I-5 crossing has become a major choking point in the regional transportation system. C-TRAN is developing financial plans to maintain a strong bus system into the future.

C-TRAN is currently updating its 20-Year Transit Development Plan. Multiple options are being considered so that C-TRAN has the financial resources to meet the growing needs of its service area. Staff is incorporating various tax revenue scenarios, multiple service options, and a no build scenario in its current plan.

5.2 Light Rail Fleet Management Plan

When the Columbia River Crossing is built with light rail, it is the intention of C-TRAN to enter into an inter-governmental agreement so that TriMet will operate and maintain the Light Rail Fleet necessary for service.

5.3 Revenue Fleet Replacement and Growth

Table 5-1. C-TRAN Fixed Route Fleet

Type	Length	Year to be Purchased	# to be Purchased	Expansion / Replacement
Fixed Route Coach	30’	2009	2	R
Fixed Route Coach	35’	2009	5	R
Fixed Route Coach	30’	2010	1	R
Fixed Route Coach	35’	2010	4	R
Fixed Route Coach	40’	2010	2	R
Fixed Route Coach	30’	2011	2	R
Fixed Route Coach	40’	2011	4	R

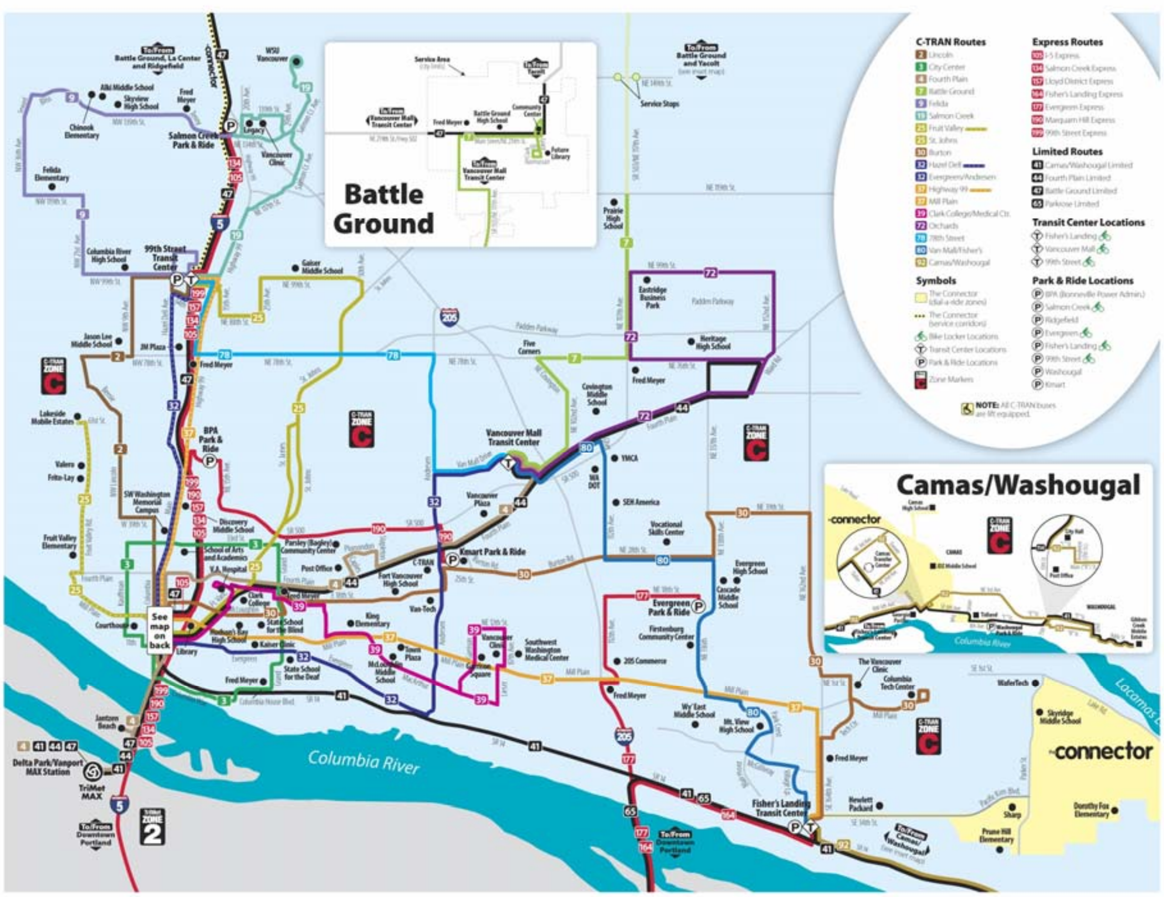
Table 5-2. C-TRAN Demand Response Fleet

Type	Length	Year to be Purchased	# to be Purchased	Expansion / Replacement
Cut-Away Chassis	25'	2009	6	R
Cut-Away Chassis	25'	2010	6	R
Cut-Away Chassis	25'	2011	6	R/E

5.4 C-TRAN Facilities

As a part of the 20-Year Transit Development Plan, C-TRAN is looking to replace or upgrade its maintenance facility. The current facility is over 25 years old. It is at or nearing capacity in regards to how many vehicles it can maintain. Furthermore, the current facility does not have the ability to maintain articulated buses. Given the growth in ridership among commuter routes and local interest in High Capacity Transit (HCT), it is becoming increasingly important to replace or upgrade the current facility with one that will be able to meet C-TRAN's future needs.

Figure 3. C-TRAN Service Map as of May 18, 2008



Addendum A – Safety Forms

This page left blank intentionally.

Addendum A- Safety Policy Forms

NEW EMPLOYEE SAFETY ORIENTATION

EMPLOYEE NAME: ________________________ DEPT:_____________________________

JOB TITLE:______________________________ DATE OF HIRE:___________________

This checklist is a guideline for conducting new employee safety orientations. Once completed and signed by the Risk Specialist and employee, it serves as documentation that a Safety Orientation has taken place. The original will be sent to the Director of Administrative Services for insertion into your personnel file.

Place a check in each space to indicate that the subjects that apply to the position have been covered.

Q Written Accident Prevention Program
- Policy Statement
- Responsibilities
  - Safety Committee
- Safety Committee Members
- Safety Inspections
- Occupational Injury/Illness
- Accident/Incident Investigation
- Emergency/Medical Care

Q Federal/State Required Training
- Personal Protective Equipment
- Respiratory Protection Procedure
- Hearing Conservation Program
- Lockout/Tagout Procedures
- Blood Borne Pathogen Exposure Control Plan

Q Safety Orientation
- Orientation Checklist
- General Safety Rules
- Education/Training
- First Aid Training/Kits/Posters
- Safety Bulletin Boards
- Exit Locations/Evacuation Routes

Q Personal Work Habits
- Horseplay
- Ladder Safety
- Machine Guarding
- Smoking Policy
- Good Housekeeping Practices
- Back Injury/repetitive Motion Injury
- Prevention
- Proper Lifting Techniques
- Power/Hand Tool Safety

NOTE TO EMPLOYEE:

DO NOT SIGN unless **ALL** items are covered and **ALL** questions are satisfactorily answered.

Date: ________________ Risk Specialist/Supervisor: ______________________________

Date: ________________ Employee’s Signature: __________________________________

I- *PERSONAL PROTECTION EQUIPMENT FORMS*

HAZARD ASSESSMENT FORM

INSTRUCTIONS: Photocopy this form (front and back) and keep the original for future hazard assessments. Use the copy as a guide for your walk-through survey. It will help you identify the hazards in each work area. Once you have completed the form, review the *Guidelines for Selecting Personal Protective Equipment* on the back of this form.

Area: Tire Room

Job Classification: Preventative Maintenance Workers (Tire/Lube)

Assessor: Fleet Maintenance Supervisor Paul Koleber

Date: Revised November 1, 2001

HAZARDS Tasks that can cause head hazards include: working below other workers who are using tools and materials which could fall, working on energized electrical equipment, working with chemicals, and working under machinery or processes which might cause materials or objects to fall.

Check the appropriate box for each hazard:

Burn..........................	Yes ■	No □
Chemical Splash.......	Yes □	No ■
Electrical Shock.........	Yes □	No ■
Impact.	Yes ■	No □

Description of Hazards:

Burn hazards when welding. Impact to head when an overhead crane is in use.

EYE HAZARDS Tasks that can cause eye hazards include: working with acids and chemicals, chipping, grinding, furnace operations, sanding, welding and woodworking.

Check the appropriate box for each hazard:

Chemicals..................	Yes □	No ■
Dust...........................	Yes ■	No □
Heat...........................	Yes □	No ■
Impact........................	Yes ■	No □
Light/Radiation...........	Yes ■	No □

Description of Hazards:

Dust, impact, light/radiation hazards from welding, working with tire machine, or in a dusty environment.

HAND HAZARDS Tasks that can cause hand hazards include: cutting material, working with chemicals and working with hot objects.

Check the appropriate box for each hazard:

Burns........................	Yes ■	No □
Chemical Exposure..	Yes □	No ■
Cuts/Abrasion...........	Yes ■	No □
Puncture...................	Yes ■	No □

Description of Hazards:

Burns, cuts, abrasions and punctures are possible when working with equipment, materials, and while changing tires.

FOOT HAZARDS Tasks that can cause foot hazards include: carrying or handling materials that could be dropped, performing manual material handling and working with chemicals.

Check the appropriate box for each hazard:

Chemical Exposure......	Yes □	No ■
Compression................	Yes ■	No □
Impact..........................	Yes ■	No □
Puncture......................	Yes ■	No □

Description of Hazards:

Handling materials and equipment which could be dropped, or getting pinched or caught between objects.

Guidelines for Selecting Personal Protective Equipment (PPE)

Note: Personal Protective Equipment alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls and sound manufacturing practices.

1. Familiarize yourself with the potential hazards in the area and the types of PPE that are available.
2. Consider the hazards associated with the environment (impact velocities, masses, projectable shape, radiation intensities, etc.)
3. Select PPE that ensures a greater level of protection than the minimum required to protect workers from the hazards.
4. Fit the worker with the PPE and give instructions on its use and care. *It is very important that workers be made aware of all warning labels for and limitations of their PPE.*

Based on the hazard assessment for Preventative Maintenance Workers (tire/lube), the following PPE is required:

HEAD HAZARD	**JOB**	**PPE**
Burns	Welding	Welders hood/head coverings required while welding.
Impact	Using overhead crane	Be aware of possible overhead hazards. Wear a hard hat if needed.
EYE HAZARD Dust	**JOB** Working with machinery	**PPE** Safety goggles required while performing these job duties.
Impact	Flying particles	
Light/Radiation	Welding	
HAND HAZARD Burns	**JOB** Working with materials, equipment, changing tires.	**PPE** Gloves required. Use gloves which are appropriate for the task being performed.
Cuts/Abrasions	Working with materials, equipment, changing tires.	Gloves required. Use gloves which are appropriate for the task being performed.
Punctures	Working with materials, equipment, changing tires.	Gloves required. Use gloves which are appropriate for the task being performed.
FOOT HAZARD Compression	**JOB** While carrying or handling materials, equipment which could be dropped, or when feet could be pinched or caught between objects.	**PPE** Steel-toed safety shoes are a requirement of this position.
Impact	While carrying or handling materials, equipment which could be dropped, or when feet could be pinched or caught between objects.	Steel-toed safety shoes are a requirement of this position
Puncture	While carrying or handling materials, equipment which could be dropped, or when feet could be pinched or caught between objects.	Steel-toed safety shoes are a requirement of this position
OTHER Respiratory Hazards	**JOB** Working on tire machine.	**PPE** Dust masks are to be worn.

HAZARD ASSESSMENT FORM

INSTRUCTIONS: Photocopy this form (front and back) and keep the original for future hazard assessments. Use the copy as a guide for your walk-through survey. It will help you identify the hazards in each work area. Once you have completed the form, review the *Guidelines for Selecting Personal Protective Equipment* on the back of this form.

Area: Paint Room/Body Shop

Job Classification: Coach Technician

Assessor: Fleet Maintenance Supervisor Paul Koleber

Date: Revised November 1, 2001

HEAD HAZARDS Tasks that can cause head hazards include: working below other workers who are using tools and materials which could fall, working on energized electrical equipment, working with chemicals, and working under machinery or processes which might cause materials or objects to fall.

Check the appropriate box for each hazard:

Burn.......................... Yes ■ No □
Chemical Splash...... Yes □ No ■
Electrical Shock....... Yes □ No ■
Impact..................... Yes ■ No □

Description of Hazards:

Burns from welding are possible.

Repairing damaged body panels and working in confined areas: Impact injury on rough, jagged, or damaged body components.

EYE HAZARDS Tasks that can cause eye hazards include: working with acids and chemicals, chipping, grinding, furnace operations, sanding, welding and woodworking.

Check the appropriate box for each hazard:

Chemicals................ Yes ■ No □
Dust.......................... Yes ■ No □
Heat.......................... Yes ■ No □
Impact...................... Yes ■ No □
Light/Radiation.......... Yes ■ No □

Description of Hazards:

Chemical splashes possible from cleaning agents and chemical use; dust from the environment, heat, light/radiation while welding; impact from flying objects while cutting, grinding, sanding, cutting or painting.

HAND HAZARDS Tasks that can cause hand hazards include: cutting material, working with chemicals and working with hot objects.

Check the appropriate box for each hazard:

Burns........................ Yes ■ No □
Chemical Exposure.. Yes ■ No □
Cuts/Abrasion........... Yes ■ No □
Puncture................... Yes ■ No □

Description of Hazards:

Hand hazards are possible when painting, welding, working with sheet metal, sanding, grinding, cutting or exposure to chemicals.

FOOT HAZARDS Tasks that can cause foot hazards include: carrying or handling materials that could be dropped, performing manual material handling and working with chemicals.

Check the appropriate box for each hazard:

Chemical Exposure... Yes ■ No □
Compression............. Yes ■ No □
Impact........................ Yes ■ No □
Puncture.................... Yes ■ No □

Description of Hazards:

Carrying or handling materials that could be dropped, or where feet could be pinched or caught between. Working with paints and other hazardous materials.

Guidelines for Selecting Personal Protective Equipment (PPE)

Note: Personal Protective Equipment alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls and sound manufacturing practices.

1 Familiarize yourself with the potential hazards in the area and the types of PPE that are available.

2 Consider the hazards associated with the environment (impact velocities, masses, projectable shape, radiation intensities, etc.)

3 Select PPE that ensures a greater level of protection than the minimum required to protect workers from the hazards.

4 Fit the worker with the PPE and give instructions on its use and care. *It is very important that workers be made aware of all warning labels for and limitations of their PPE.*

Based on the hazard assessment for Coach Technicians, the following PPE is required:

HEAD HAZARD	**JOB**	**PPE**
Burns	While welding	Welding hood/head covering required while welding
EYE HAZARD	**JOB**	**PPE**
Potential for all eye hazards	Some risk for most job tasks	The appropriate safety goggles or safety glasses are required to be worn for the job being performed.
		Welders hoods with full-face shields are required to be worn while welding.
HAND HAZARD	**JOB**	**PPE**
Potential for all hand hazards	Welding/cutting/grinding	Appropriate gloves for specific job being performed from single-use gloves to welder's gloves.
	Sanding/painting/mixing paints	
FOOT HAZARD	**JOB**	**PPE**
Potential for compression	While carrying or handling materials or equipment that could be dropped	Steel-toe safety shoes are a requirement of this position
Impact and puncture hazards	Where feet could be pinched or caught between objects	
OTHER	**JOB**	**PPE**
Hearing Protection	While operating sanders and other loud machinery	Ear plugs are to be worn
Respiratory Protection	Painting/mixing paint	Appropriate respirator for job being performed (from dust mask to air-supplied respirator)
	Sanding/grinding	

HAZARD ASSESSMENT FORM

INSTRUCTIONS: Photocopy this form (front and back) and keep the original for future hazard assessments. Use the copy as a guide for your walk-through survey. It will help you identify the hazards in each work area. Once you have completed the form, review the *Guidelines for Selecting Personal Protective Equipment* on the back of this form.

Area: Component Rebuild Room — Job Classification: Lead Mechanics/Mechanics

Assessor: Fleet Maintenance Supervisor Paul Koleber — Date: Revised November 1, 2001

HEAD HAZARDS Tasks that can cause head hazards include: working below other workers who are using tools and materials which could fall, working on energized electrical equipment, working with chemicals, and working under machinery or processes which might cause materials or objects to fall.

Check the appropriate box for each hazard:

Burn............................	Yes ■	No □
Chemical Splash........	Yes ■	No □
Electrical Shock...........	Yes ■	No □
Impact..........................	Yes ■	No □

Description of Hazards:

Burn hazard from hot engines. And burn hazard potential while welding.
Impact hazards may be possible while working underneath buses.

Working with A/C refrigerant.

Working with vehicle electrical systems in a wet environment.

EYE HAZARDS Tasks that can cause eye hazards include: working with acids and chemicals, chipping, grinding, furnace operations, sanding, welding and woodworking.

Check the appropriate box for each hazard:

Chemicals..................	Yes ■	No □
Dust..........................	Yes ■	No □
Heat..........................	Yes ■	No □
Impact.......................	Yes ■	No □
Light/Radiation.........	Yes ■	No □

Description of Hazards:

All hazards are possible while performing job tasks, including parts cleaning, painting, grinding, drilling, and general maintenance of coaches.

HAND HAZARDS Tasks that can cause hand hazards include: cutting material, working with chemicals and working with hot objects.

Check the appropriate box for each hazard:

Burns..........................	Yes ■	No □
Chemical Exposure....	Yes ■	No □
Cuts/Abrasion............	Yes ■	No □
Puncture.....................	Yes ■	No □

Description of Hazards:

All hazards are possible while performing job tasks, including using torches, hand tools, working with sharp objects, parts cleaning, repairing and overhauling engines and transmissions.

FOOT HAZARDS Tasks that can cause foot hazards include: carrying or handling materials that could be dropped, performing manual material handling and working with chemicals.

Check the appropriate box for each hazard:

Chemical Exposure.......	Yes □	No ■
Compression..........	Yes ■	No □
Impact......................	Yes ■	No □
Puncture.....................	Yes ■	No □

Description of Hazards:

Falling objects, slippery surfaces, carrying or handling materials that could be dropped.

Guidelines for Selecting Personal Protective Equipment (PPE)

Note: Personal Protective Equipment alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls and sound manufacturing practices.

1 Familiarize yourself with the potential hazards in the area and the types of PPE that are available.

2 Consider the hazards associated with the environment (impact velocities, masses, projectable shape, radiation intensities, etc.)

3 Select PPE that ensures a greater level of protection than the minimum required to protect workers from the hazards.

4 Fit the worker with the PPE and give instructions on its use and care. *It is very important that workers be made aware of all warning labels for and limitations of their PPE.*

Based on the hazard assessment for Lead Mechanics/Mechanics, the following PPE is required:

HEAD HAZARD	**JOB**	**PPE**
Impact	While working underneath equipment.	None required.
		Be aware of potential hazards.
EYE HAZARD	**JOB**	**PPE**
Potential for all eye hazards	Most all required job tasks.	Appropriate safety goggles or safety glasses required for job task being performed.
HAND HAZARD	**JOB**	**PPE**
Potential for all hand hazards	Most all required job tasks.	Appropriate gloves are to be worn depending upon the job being performed.
FOOT HAZARD	**JOB**	**PPE**
Potential for compression, impact and puncture hazards	Working with equipment, parts and materials.	Steel-toed safety shoes are a requirement of this position.
OTHER	**JOB**	**PPE**
Hearing protection	Working around excessive noise from machinery and equipment.	Ear plugs or muffs required.
Respiratory protection	While sanding, grinding, chipping or painting.	Use appropriate respirator for job being performed from a dust mask to an organic vapor respirator.

HAZARD ASSESSMENT FORM

INSTRUCTIONS: Photocopy this form (front and back) and keep the original for future hazard assessments. Use the copy as a guide for your walk-through survey. It will help you identify the hazards in each work area. Once you have completed the form, review the *Guidelines for Selecting Personal Protective Equipment* on the back of this form.

Area: Maintenance/Fuel Island Job Classification: Vehicle Service Worker

Assessor: Fleet Maintenance Supervisor Paul Koleber Date: Revised November 1, 2001

HEAD HAZARDS Tasks that can cause head hazards include: working below other workers who are using tools and materials which could fall, working on energized electrical equipment, working with chemicals, and working under machinery or processes which might cause materials or objects to fall.

Check the appropriate box for each hazard:

Burn..........................	Yes ■	No □
Chemical Splash.......	Yes □	No ■
Electrical Shock.........	Yes ■	No □
Impact........................	Yes ■	No □

Description of Hazards:

Working around hot engines.
N/A
Working around vehicle electrical systems in a wet environment.
Working around operating engines.

EYE HAZARDS Tasks that can cause eye hazards include: working with acids and chemicals, chipping, grinding, furnace operations, sanding, welding and woodworking.

Check the appropriate box for each hazard:

Chemicals..................	Yes ■	No □
Dust..........................	Yes ■	No □
Heat..........................	Yes □	No ■
Impact.......................	Yes ■	No □
Light/Radiation..........	Yes □	No ■

Description of Hazards:

Working with chemicals and cleaning solutions, dust and environmental hazards while cleaning coaches.

Working around operating engines with potential of a flying foreign object.

HAND HAZARDS Tasks that can cause hand hazards include: cutting material, working with chemicals and working with hot objects.

Check the appropriate box for each hazard:

Burns............................	Yes ■	No □
Chemical Exposure.......	Yes ■	No □
Cuts/Abrasion..............	Yes ■	No □
Puncture...................	Yes ■	No □

Description of Hazards:

Working with hot engines and components.
Working with chemicals/cleaning solutions. Cuts, abrasions and punctures possible while performing general clean up of coaches.
Working with operating engines with multiple sharp ? in the engine environment.

FOOT HAZARDS Tasks that can cause foot hazards include: carrying or handling materials that could be dropped, performing manual material handling and working with chemicals.

Check the appropriate box for each hazard

Chemical Exposure....	Yes □	No ■
Compression.............	Yes ■	No □
Impact.........................	Yes ■	No □
Puncture.....................	Yes ■	No □

Description of Hazards:

Handling materials that could be dropped.
Working around moving vehicles on a slippery surface.
Working at night with foreign objects that may come from vehicle components.

Guidelines for Selecting Personal Protective Equipment (PPE)

Note: Personal Protective Equipment alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls and sound manufacturing practices.

1. Familiarize yourself with the potential hazards in the area and the types of PPE that are available.
2. Consider the hazards associated with the environment (impact velocities, masses, projectable shape, radiation intensities, etc.)
3. Select PPE that ensures a greater level of protection than the minimum required to protect workers from the hazards.
4. Fit the worker with the PPE and give instructions on its use and care. *It is very important that workers be made aware of all warning labels for and limitations of their PPE.*

Based on the hazard assessment for Vehicle Service Workers, the following PPE is required:

HEAD HAZARD	JOB	PPE
Burn	Working around hot engines.	None, awareness of possible hazards.
Electrical Shock	Working around electrical systems in wet environment.	None, awareness of possible hazards.
Impact	Working around operating engines.	None, awareness of possible hazards.
EYE HAZARD	**JOB**	**PPE**
Chemicals	Cleaning interior and exterior of buses.	Safety goggles as necessary when cleaning and fueling.
Dust	Cleaning interior and exterior of buses.	Safety goggles as necessary when cleaning and fueling.
Impact	Working around operating engines.	None, awareness of possible hazards.
HAND HAZARD	**JOB**	**PPE**
Burns Chemical exposure	Working with hot engines and components. Cleaning interior and exterior of buses.	Rubber gloves as necessary while cleaning coaches.
Cuts/Abrasions Punctures	Working with operating engines with multiple sharp hazards in the engine compartment.	None, awareness of possible hazards.
FOOT HAZARD	**JOB**	**PPE**
Impact	Cleaning interior and exterior of buses.	Steel-toed safety shoes are a requirement of this position.
Compression	Working around moving vehicles on slippery surface.	Steel-toed safety shoes are a requirement of this position.
Puncture	Working at night with foreign objects that may come from vehicle components.	Steel-toed safety shoes are a requirement of this position.
OTHER	**JOB**	**PPE**
Hearing Protection	Using heavy-duty vacuum cleaning system	Ear plugs are required while performing this task.
Collision (Night vision)	Moving from one vehicle to another in parking area.	Safety vests.

HAZARD ASSESSMENT FORM

INSTRUCTIONS: Photocopy this form (front and back) and keep the original for future hazard assessments. Use the copy as a guide for your walk-through survey. It will help you identify the hazards in each work area. Once you have completed the form, review the *Guidelines for Selecting Personal Protective Equipment* on the back of this form.

Area: Parts/Inventory Job Classification: Inventory Technicians

Assessor: Inventory Supervisor Date: Revised November 1, 2001

HEAD HAZARDS Tasks that can cause head hazards include: working below other workers who are using tools and materials which could fall, working on energized electrical equipment, working with chemicals, and working under machinery or processes which might cause materials or objects to fall.

Check the appropriate box for each hazard:

Hazard	Yes	No
Burn..........................	Yes ☐	No ☐
Chemical Splash......	Yes ☐	No ☐
Electrical Shock.........	Yes ☐	No ☐
Impact........................	Yes ■	No ☐

Description of Hazards:

Impact possible from overhead hoist, falling objects and moving parts and equipment located overhead.

EYE HAZARDS Tasks that can cause eye hazards include: working with acids and chemicals, chipping, grinding, furnace operations, sanding, welding and woodworking.

Check the appropriate box for each hazard:

Hazard	Yes	No
Chemicals.................	Yes ☐	No ■
Dust..........................	Yes ☐	No ■
Heat..........................	Yes ☐	No ■
Impact.......................	Yes ☐	No ■
Light/Radiation..........	Yes ☐	No ■

Description of Hazards:

HAND HAZARDS Tasks that can cause hand hazards include: cutting material, working with chemicals and working with hot objects.

Check the appropriate box for each hazard:

Hazard	Yes	No
Burns........................	Yes ☐	No ☐
Chemical Exposure..	Yes ☐	No ☐
Cuts/Abrasion...........	Yes ■	No ☐
Puncture....................	Yes ■	No ☐

Description of Hazards:

Cuts/abrasions from opening boxes, handling equipment; and puncture hazards from handling equipment parts and materials.

FOOT HAZARDS Tasks that can cause foot hazards include: carrying or handling materials that could be dropped, performing manual material handling and working with chemicals.

Check the appropriate box for each hazard:

Hazard	Yes	No
Chemical Exposure....	Yes ☐	No ☐
Compression..............	Yes ■	No ☐
Impact........................	.Yes ■	No ☐
Puncture.....................	Yes ■	No ☐

Description of Hazards:

Handling materials and equipment which could be dropp-ed or where feet could be pinched or caught between.

Guidelines for Selecting Personal Protective Equipment (PPE)

Note: Personal Protective Equipment alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls and sound manufacturing practices.

1 Familiarize yourself with the potential hazards in the area and the types of PPE that are available.

2 Consider the hazards associated with the environment (impact velocities, masses, projectable shape, radiation intensities, etc.)

3 Select PPE that ensures a greater level of protection than the minimum required to protect workers from the hazards.

4 Fit the worker with the PPE and give instructions on its use and care. *It is very important that workers be made aware of all warning labels for and limitations of their PPE.*

Based on the hazard assessment for Inventory Technician, the following PPE is required:

HEAD HAZARD	**JOB**	**PPE**
Impact	Moving parts and equipment which is located overhead.	None required. Awareness of possible hazard, and use of hard hats if needed.
EYE HAZARD	**JOB**	**PPE**
Dust		
HAND HAZARD	**JOB**	**PPE**
Cuts/Abrasions	Opening boxes with razor blades	Gloves as necessary for the job being performed.
Punctures	Handling parts, materials and heavy equipment with sharp edges	Gloves as necessary for the job being performed.
FOOT HAZARD	**JOB**	**PPE**
Compression	Handling and moving of parts, equipment and boxes that could be dropped or where feet can be pinched or caught between.	Steel-toed safety shoes are a requirement for this position.
Impact		
Puncture		
OTHER	**JOB**	**PPE**

HAZARD ASSESSMENT FORM

INSTRUCTIONS: Photocopy this form (front and back) and keep the original for future hazard assessments. Use the copy as a guide for your walk-through survey. It will help you identify the hazards in each work area. Once you have completed the form, review the *Guidelines for Selecting Personal Protective Equipment* on the back of this form.

Area: Bus Wash Area Job Classification: Janitor/Hostler

Assessor: Fleet Maintenance Supervisor Paul Koleber Date: Revised November 1, 2001

HEAD HAZARDS Tasks that can cause head hazards include: working below other workers who are using tools and materials which could fall, working on energized electrical equipment, working with chemicals, and working under machinery or processes which might cause materials or objects to fall.

Check the appropriate box for each hazard:

Burn.........................	Yes	☐	No	■
Chemical Splash.....	Yes	☐	No	■
Electrical Shock......	Yes	☐	No	■
Impact.....................	Yes	☐	No	■

Description of Hazards:

N/A

EYE HAZARDS Tasks that can cause eye hazards include: working with acids and chemicals, chipping, grinding, furnace operations, sanding, welding and woodworking.

Check the appropriate box for each hazard:

Chemicals..............	Yes	■	No	☐
Dust........................	Yes	■	No	☐
Heat........................	Yes	☐	No	■
Impact.....................	Yes	☐	No	■
Light/Radiation........	Yes	☐	No	■

Description of Hazards:

Working with chemicals and cleaning solutions. Dust and environmental hazards while cleaning coaches.

HAND HAZARDS Tasks that can cause hand hazards include: cutting material, working with chemicals and working with hot objects.

Check the appropriate box for each hazard:

Burns........................	Yes	☐	No	■
Chemical Exposure..	Yes	■	No	☐
Cuts/Abrasion...........	Yes	■	No	☐
Puncture...................	Yes	■	No	☐

Description of Hazards:

Chemical/cleaning solutions, cuts/abrasions and punctures while performing general clean up of coaches.

FOOT HAZARDS Tasks that can cause foot hazards include: carrying or handling materials that could be dropped, performing manual material handling and working with chemicals.

Check the appropriate box for each hazard:

Chemical Exposure......	Yes	☐	No	■
Compression................	Yes	■	No	☐
Impact..........................	Yes	■	No	☐
Puncture......................	Yes	☐	No	■

Description of Hazards:

Handling materials that could be dropped, pinched or caught between objects.

Guidelines for Selecting Personal Protective Equipment (PPE)

Note: Personal Protective Equipment alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls and sound manufacturing practices.

1 Familiarize yourself with the potential hazards in the area and the types of PPE that are available.

2 Consider the hazards associated with the environment (impact velocities, masses, projectable shape, radiation intensities, etc.)

3 Select PPE that ensures a greater level of protection than the minimum required to protect workers from the hazards.

4 Fit the worker with the PPE and give instructions on its use and care. *It is very important that workers be made aware of all warning labels for and limitations of their PPE.*

Based on the hazard assessment for Janitors/Hostlers, the following PPE is required:

HEAD HAZARD	**JOB**	**PPE**
N/A	N/A	N/A
EYE HAZARD	**JOB**	**PPE**
Chemicals	Cleaning interior and exterior of buses	Safety goggles required
Dust		
HAND HAZARD	**JOB**	**PPE**
Chemical Exposure	Cleaning interior and exterior of buses	Rubber gloves as necessary while performing job duties
Cuts/Abrasions		
Punctures		
FOOT HAZARD	**JOB**	**PPE**
Impact	Cleaning interior and exterior of buses.	Steel-toed safety shoes are a requirement for this position
	Carrying or handling materials or equipment that could be dropped.	
OTHER	**JOB**	**PPE**
Hearing Protection	Using heavy-duty vacuum cleaning system	Ear plugs are required while performing this task
Collision (Night vision)	**Moving from one vehicle to another in parking area.**	**Safety vests.**

HAZARD ASSESSMENT FORM

INSTRUCTIONS: Photocopy this form (front and back) and keep the original for future hazard assessments. Use the copy as a guide for your walk-through survey. It will help you identify the hazards in each work area. Once you have completed the form, review the *Guidelines for Selecting Personal Protective Equipment* on the back of this form.

Area: Buildings and Grounds Job Classification: Facility Maintenance and Facility Service Workers

Assessor: Facility Maintenance Manager Date: Revised November 1, 2001

HEAD HAZARDS Tasks that can cause head hazards include: working below other workers who are using tools and materials which could fall, working on energized electrical equipment, working with chemicals, and working under machinery or processes which might cause materials or objects to fall.

Check the appropriate box for each hazard:			Description of Hazards:
Burn............................	Yes ■	No □	Impact – Chemical splash—cleaning and replacing chemical in large parts washer. Hazards possible while working at shelters in high traffic areas and trimming trees. Burn hazards while welding. Electrical shock possible while repairing electrical wiring, repairing of cords, motors and wall plugs.
Chemical Splash........	Yes ■	No □	
Electrical Shock...........	Yes ■	No □	
Impact..........................	Yes ■	No □	

EYE HAZARDS Tasks that can cause eye hazards include: working with acids and chemicals, chipping, grinding, furnace operations, sanding, welding and woodworking.

Check the appropriate box for each hazard:			Description of Hazards:
Chemicals...................	Yes ■	No □	All hazards are possible while working with fertilizers and chemicals, cutting, welding, chipping, grinding, sanding, painting and while performing yard maintenance work and while working outside in the heat.
Dust..........................	Yes ■	No □	
Heat..........................	Yes ■	No □	
Impact.......................	Yes ■	No □	
Light/Radiation..........	Yes ■	No □	

HAND HAZARDS Tasks that can cause hand hazards include: cutting material, working with chemicals and working with hot objects.

Check the appropriate box for each hazard:			Description of Hazards:
Burns........................	Yes ■	No □	Cutting material, working with chemicals, hot objects, garbage cleanup and yard maintenance.
Chemical Exposure..	Yes ■	No □	
Cuts/Abrasion...........	Yes ■	No □	
Puncture...................	Yes ■	No □	

FOOT HAZARDS Tasks that can cause foot hazards include: carrying or handling materials that could be dropped, performing manual material handling and working with chemicals.

Check the appropriate box for each hazard:			Description of Hazards:
Chemical Exposure......	Yes ■	No □	Carrying or handling material or equipment that could be dropped, working with chemicals, getting pinched or caught between objects.
Compression................	Yes ■	No □	
Impact..........................	Yes ■	No □	
Puncture	Yes ■	No □	

Guidelines for Selecting Personal Protective Equipment (PPE)

Note: Personal Protective Equipment alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls and sound manufacturing practices.

1 Familiarize yourself with the potential hazards in the area and the types of PPE that are available.

2 Consider the hazards associated with the environment (impact velocities, masses, projectable shape, radiation intensities, etc.)

3 Select PPE that ensures a greater level of protection than the minimum required to protect workers from the hazards.

4 Fit the worker with the PPE and give instructions on its use and care. *It is very important that workers be made aware of all warning labels for and limitations of their PPE.*

Based on the hazard assessment for Facility Maintenance and Facility Service Workers, the following PPE is required:

HEAD HAZARD	**JOB**	**PPE**
	While providing traffic control when trimming trees. Trimming trees.	Hard hats are to be worn. N/A
	Impact	
	Burn	Welder's hood/head covering while welding.
EYE HAZARD	**JOB**	**PPE**
Chemicals	Working with chemicals/fertilizers/paint	Safety goggles required while performing these job duties.
Dust/Impact	Chipping, grinding, yard maintenance, sanding	
Heat/Light/Radiation	Sanding, grinding, welding/using portable pressure washer working in the sun.	Protective clothing.
HAND HAZARD	**JOB**	**PPE**
All hand hazards are possible	All job responsibilities	Gloves required. Use gloves which are appropriate for the task being performed.
FOOT HAZARD	**JOB**	**PPE**
All foot hazards are possible	All job responsibilities	Steel-toed safety shoes are a requirement for this position.
OTHER	**JOB**	**PPE**
Hearing Protection	Yard equipment/noisy machinery	Ear plugs/muffs required.
Respiratory Protection	Working with fertilizers, chemicals, paint	Appropriate respirator/dust mask required.
Protective Clothing	Cleaning outside shelters, facility maintenance, unplugging drains	Rubber jackets, pants, and gloves are to be worn. Reflective vest.

C-TRAN

ACKNOWLEDGMENT OF TRAINING RECEIVED

EMPLOYEE NAME: ______________________ DATE OF HIRE: ____________

POSITION ASSIGNED: ___________________________ DEPT: ____________________________________

SUBJECT: PERSONAL PROTECTIVE EQUIPMENT (PPE)

The following information has been covered in this training session:

_____ Overview of WAC 296-24-075 standard

_____ Hazard assessments

_____ Examples of hazards

_____ Show video

_____ Test administered

_____ What PPE is necessary for the position

_____ How to properly out on, take off, and adjust the PPE

_____ Limitations of the PPE

_____ Cleaning, maintenance, and storage of PPE

_________ Acknowledgment of training signed/PPE issued

____ ________________________

Maintenance Training Supervisor Date

I have received and understood the training given to me by C-TRAN on personal protective equipment to be used:

(a) when working in ____, and/or

(identify work area)

(b) when conducting the following tasks: ____

____

____

____

The following Personal Protective Equipment has been assigned for me to use:

Check applicable box: Identify specific assigned PPE:

{ } Eye and face protection

{ } Head protection

{ } Foot protection

{ } Hand protection

{ } Respiratory protection

____ ____

Employee Signature Date

II- *RESPIRATOR PROTECTION PROGRAM FORMS*

WISHA Respirator Medical Evaluation Questionnaire

To the employer:
You must not review employee questionnaires.

To the employer's PLHCP:
Answers to questions in Section 1 and question 9 in Section 2 of Part A do not require further medical evaluations.

To the employee:
Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1. Mandatory

The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date:____________________ 2. Your name:______________________________

3. Your age (to nearest year):_________ 4. Sex (circle one): Male/Female

5. Your height:_________ft.__________in. 6. Your weight:___________lbs.

7. Your job title:____

8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code):__________________________________

9. The best time to telephone you at this number:_______________________________

10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes / No

11. Check the type of respirator you will use (you can check more than one category):
    a._____N, R, or P disposable respirator (dust mask style, half face piece respirators without cartridges)
    b._____Check all that apply.
    - ❑ Half mask ❑ Full face piece mask ❑ Helmet hood ❑ Escape
    - ❑ Non-powered cartridge or canister ❑ Powered air-purifying cartridge respirator (PAPR)
    - ❑ Supplied-air or Air-line ❑ Disposable filtering face piece (for example N-95)
    - Self contained breathing apparatus (SCBA): ❑ Demand or ❑ Pressure demand

    Other: ____

12. Have you worn a respirator (circle one): Yes / No
    If "yes," what type(s):____
    ____

Part A. Section 2. Mandatory (Cont.)

5.	Have you *ever had* any of the following cardiovascular or heart problems?	
a.	Heart attack:	Yes / No
b.	Stroke:	Yes / No
c.	Angina:	Yes / No
d.	Heart failure:	Yes / No
e.	Swelling in your legs **or** feet (not caused by walking):	Yes / No
f.	Heart arrhythmia (heart beating irregularly):	Yes / No
g.	High blood pressure:	Yes / No
h.	Any other heart problem that you've been told about:	Yes / No
6.	Have you *ever had* any of the following cardiovascular or heart symptoms?	
a.	Frequent pain or tightness in your chest:	Yes / No
b.	Pain or tightness in your chest during physical activity:	Yes / No
c.	Pain or tightness in your chest that interferes with your job:	Yes / No
d.	In the past two years, have you noticed your heart skipping or missing a beat:	Yes / No
e.	Heartburn or indigestion that is not related to eating:	Yes / No
f.	Any other symptoms that you think may be related to heart or circulaiion problems:	Yes / No
7.	Do you *currently* take medication for any of the following problems?	
a.	Breathing or lung problems:	Yes / No
b.	Heart trouble:	Yes / No
c.	Blood pressure:	Yes / No
d.	Seizures (fits):	Yes / No

8. If you've used a respirator, have you *ever had* any of the following problems?
(If you've never use a respirator, check the following space and go to question 9:)

a.	Eye irritation:	Yes / No
b.	Skin allergies or rashes:	Yes / No
c.	Anxiety:	Yes / No
d.	General weakness or fatigue:	Yes / No
e.	Any other problem that interferes with your use of a respirator:	Yes / No

9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes / No

Part B: PLHCP Discretionary Questions

If appropriate to specific job requirements or conditions, additional questions–including but not limited to the following–may be added at the discretion of the health care professional to clarify an employee's ability to use a respirator:

1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: Yes / No
   If "yes," do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: Yes / No

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (for example, gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: Yes / No
   If "yes," name the chemicals if you know them:

3. Have you ever worked with any of the materials, or under any of the conditions, listed below:
   a. Asbestos: Yes / No
   b. Silica (for example, in sandblasting): Yes / No
   c. Tungsten/cobalt (for example, grinding or welding this material): Yes / No
   d. Beryllium: Yes / No
   e. Aluminum: Yes / No
   f. Coal (for example, mining): Yes / No
   g. Iron:Yes/No
   h. Tin:YesINo
   i. Dusty environments: Yes / No
   j. Any other hazardous exposures: Yes / No If "yes," describe these exposures:

4. List any second jobs or side businesses you have:

5. List your previous occupations:

6. List your current and previous hobbies:

7. Have you been in the military services? Yes / No
   If "yes," were you exposed to biological or chemical agents (either in training or combat): Yes / No

8. Have you ever worked on a HAZMAT team? Yes / No

9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): Yes / No
   If "yes," name the medications if you know them:

10. Will you be using any of the following items with your respirator(s)?
    a. HEPA Filters: Yes / No
    b. Canisters (for example, gas masks): Yes / No
    c. Cartridges: Yes / No

11. How often are you expected to use the respirator(s) (circle "yes" or "no" for all answers that apply to you?:
    a. Escape only (no rescue): Yes/No
    b. Emergency rescue only: Yes/No
    c. Less than 5 hours *per week*: Yes/No
    d. Less than 2 hours *per day*: Yes/No
    e. 2 to 4 hours per day: Yes/No
    f. Over 4 hours per day: Yes/No

This form is for the use of PLHCPs who are providing recommendations to employers regarding employee clearance for respirator use. Completion of this form satisfies the requirement for PLHCP's recommendations as detailed in WAC 296-62-07155. The following information is purposely limited in order to maintain employee confidentiality.

Employee Name:	Health Care Professional Name:
Employer Name:	
Address:	Address:
Phone:	Phone:

Type of Respirator This Individual is Medically Cleared to Use

Check all that apply.

Half-mask　　Full facepiece mask　　Helmet Hood　　Escape

Non-powered cartridge or canister　　Powered air-purifying cartridge respirator (PAPR)

Supplied-air or Air-line　　Disposable filtering facepiece (for example N-95)

Self contained breathing apparatus (SCBA):　　Demand or　Pressure demand

Other: ______________________________

Respirator Clearance

Under the conditions described in the supplemental information provided by the employer, this individual: (please check one)

______________ is medically cleared for use of the respirator(s) without limitations.

______________ is medically cleared for use of the respirator(s) with the following limitations:

____

____

______________ **is not** medically cleared for use of a respirator.

Workload Limitations

unrestricted　　heavy　　medium　　light

Follow-up Medical Evaluations

This individual will/will not (circle one) require additional follow-up medical evaluation(s). The recommended schedule for follow-up medical evaluations, if necessary, is as follows:

____

____

Employee Notification

I certify that the above named individual for whom this respirator clearance form is provided has received a copy of this recommendation.

Signature ______________________________ Date ______________

(Physician or other Licensed Health Care Professional) [Statutory Authority: RCW 49.17.010, .040, .050. 99-10 (Order 98-10) § 296-62-07257, filed 05/04/99, effective 09/01/99.]

Respirator Training Record

____

Employee Name (printed)

I certify that I have been trained in the use of the following:

This training included the inspection procedures, fitting, maintenance and limitations of the above respirator(s). I understand how the respirator operates and provides protection. I further certify that I have heard the explanation of the unit(s) as described above and I understand the instructions relevant to use, cleaning, disinfecting and the limitations of the unit(s).

____

Employee Signature

____

Instructor Signature

____

Date

III- *HAZARDOUS COMMUNICATION / EMPLOYEE'S RIGHT TO KNOW FORMS*

C-TRAN

ACKNOWLEDGMENT OF TRAINING RECEIVED

EMPLOYEE NAME: ______________________ DATE OF HIRE: __________________

POSITION ASSIGNED: ____________________ DEPT: _________________________

SUBJECT: HAZARDOUS COMMUNICATIONS / YOUR RIGHT TO KNOW

The following information has been covered in this training session:

______ Overview of the Hazard Communication Standard

______ Hazardous Communications video

______ HMIS Labeling video

______ Location/availability of C-TRAN's Hazardous Communications Program

______ MSDS sheets/location of binders

______ Symptoms of overexposure

______ Steps C-TRAN has taken to lessen or prevent employee exposure to chemicals

______ When and how to report leaks and spills

_______ Location of C-TRAN=s Hazard Communications Program

_______ Hazardous chemicals specific to department

_______ Container labeling/warning labels

_______ Proper use of materials containing chemicals

_______ Detection of the presence or release of hazardous chemicals

_______ Exposure procedures to follow

_______ Employee protection through work practices, emergency procedures, and the use of personal protective equipment

_______ Spill cleanup procedures

_______ Administrator test

____________________ ___________ ______________________________ __________

Risk Specialist Date Maintenance Training Supervisor Date

I certify that I have received and understand the information presented to me on the above-subject matter.

____ _________________________

Employee Signature Date

MSDS List By Name

Date Printed:5/15/2006

Product Name	MSDS No.	Product No.	Manufacturer	Last Rev.
1065/5046/5047/5065 Dry Ink	MSDS-00973	6951	Xerox Corporation	2/25/1992
175-59&60, 720W&R	MSDS-00736		ABEX Corporation Friction Products Division	11/12/1985
20/10 Concentrated Instant Windshield Cleaner	MSDS-00164	4703	20/10 Products, Inc.	3/1/1986
271 High Strengh Threadlocker Red	MSDS-00858		Loctite Corporation	1/22/1996
3835 Plastic Prep	MSDS-00203		SEM Products	2/10/1986
3835 Plastic Prep	MSDS-00909	5418	Sem Products	2/10/1986
3910 Bumper Coater	MSDS-00906		Sem Products	2/10/1986
3911 Flexible Bumper Sealer	MSDS-00907	5419	Sem Products	2/10/1986
3913 Flexible Primer Surfacer	MSDS-00202		SEM Products	2/10/1986
3M Rubber Treatment and Tire Dressing	MSDS-00159	9771	3M Center	11/1/1995
4,4' - Dipyridyl, 98%	MSDS-00731		Aldrich Chemical Co.	12/13/1990
400 AF SG, Fibered Roof CTG.	MSDS-00831		Gilsonite, Inc.	11/18/1992
5-56 Aerosol	MSDS-00071		CRC Chemicals	11/1/1985
5033U	MSDS-00790	5462	E.I. DuPont de Nemours & Co., Inc.	2/2/1998
5100/5800 Developer	MSDS-00963		Xerox Corporation	7/16/1997
5100/5800 Dry Ink	MSDS-00965		Xerox Corporation	7/17/1997
931-(66, 83, 162&162A)	MSDS-00737		ABEX Corporation Friction Products Division	11/12/1985
Absorbant Floor Dry	MSDS-00086		Eagle-Picher Minerals, Inc	
Absorbant Floor Dry	MSDS-00818		Eagle-Picher Minerals, Inc.	6/21/1988
Acetone	MSDS-00289	12009	Ashland Inc	
Acetone - Dimethyl Ketone	MSDS-00003		EM Science	11/8/1996
ACME Norosac 10G Dichlobenil Herbicide	MSDS-00185		PBI/Gordon Corp	12/12/1989
Acrylic Lacquer	MSDS-00200		SEM Products	2/10/1986
Acrylic Lacquer Primers and Sealers	MSDS-00792		DuPont Co.	1/1/1995
Activater Glasurit Primer	MSDS-00350	12777	Glasurit Auto Refinish	
Activator 4075S	MSDS-00233	11824	Du Pont	1/1/1999
Activator Epoxy Primer	MSDS-00321	12268	R-M Diamont	
Activator for Chromebase	MSDS-00228	8276	Du Pont	
Activator for URO Primer	MSDS-00310	129	Du Pont	
ACTIVATOR IMRON 5000	MSDS-00259	9108	Du Pont	1/1/1999
Activator Paint Reducers	MSDS-00784	8275	DuPont Co.	1/24/1996
ACTIVATOR PRIMER	MSDS-00263	10842	Du Pont	12/1/1998

Additive Paint	MSDS-00227	1917	Du Pont	
Additives for Topcoat	MSDS-00250	1917	Du Pont	
Additives For Topcoats	MSDS-00795	5519	E.I. du Pont de Nemours & Co	1/1/1993
Adhesive (1XA)	MSDS-00150	8759	3M Center	11/24/1997
Adhesive Cement Plexiglass	MSDS-00270	10867	IPS Corp.	
Adhesive Clear Genral Trim	MSDS-00147	7338	3M Center	2/12/1997
adhesive cove base	MSDS-00294	7306	FRANKLIN INT.	
Adhesive Duramix 4125	MSDS-00254	7254	Polymer Engineering Corp	9/8/1998
Adhesive Gasket Spray	MSDS-00951	3878	VersaChem Corporation	9/7/1988
Adhesive Heavy Duty Trim	MSDS-00873	8759	Norton Company	3/1/1992
Adhesive Rear view Mirror	MSDS-00952	6598	VersaChem Corporation	1/1/1994
Adhesive Rear View Mirror Primer	MSDS-00859	6598	Loctite Corporation	8/20/1998
Adhesive Remover Quick-N	MSDS-00296	9930	Auto Tech	10/1/1998
Adhesive Sealer Seam	MSDS-00239	7256	Polymer Engineering Corp	
Adhesive Spray 77	MSDS-00005		3M Center	2/25/1997
Adhesive Tightening compound	MSDS-00340	12447	Loctite Corporation	
Adhesive Weatherstrip	MSDS-00337	0212	Loctite Corporation	
Adhesive, Quick Weld	MSDS-00928		Tremco Autobody Technologies	4/26/1995
Air Tool Oil	MSDS-00040	9057	Coilhose Pneumatics	11/10/1986
Airco 6011	MSDS-00113		The Lincoln Electric Company	9/19/1996
Airco 6011	MSDS-00856		The Lincoln Electric Company	9/19/1986
Airco 6013	MSDS-00114		The Lincoln Electric Company	12/2/1986
Airco 6013	MSDS-00855		The Lincoln Electric Company	12/2/1986
Airco Easy - Arc 7018AC	MSDS-00115		The Lincoln Electric Company	10/21/1986
Airco Easy-Arc 7018AC	MSDS-00854		The Lincoln Electric Company	10/21/1986
Aircosil 12 squeeze	MSDS-00091		American Solder & Flux Co. Inc	
Aircosil 12 Squeeze	MSDS-00823		Force Chemicals Division, American Solder & Flux Co., Inc.	7/1/1985
Aircraft Hydraulic Oil 15	MSDS-00941	4999	Texaco Lubricants Company A Division of Texaco Refining and	7/31/1995
Alcohol	MSDS-00125		Midwest Grain Products Co	11/15/1985
All Purpose Epoxy (Kit) Part A	MSDS-00933		Tremco Autobody Technologies	1/9/1995
All Purpose Epoxy (Kit) Part B	MSDS-00932		Tremco Autobody Technologies	1/9/1995
Alum (Dry)	MSDS-00832	8365	General Chemical Corporation	12/1/1993
Aluminum Alloy	MSDS-00099		IRC Aluminum & Stainless	
Aluminum Alloy	MSDS-00841		IRC Aluminum & Stainless	
Aluminum Alloys	MSDS-00734		Aluminum Comany of America	6/30/1988
Aluminum Sulphate	MSDS-00345	603	Great Western Chemical	9/23/1991

Amsoil Grease Multipurpose Lithium Complex Grease	MSDS-00728		Amsoil Inc.	8/12/1992
Anti-Freeze Air Brake System	MSDS-00893	5063	Radiator Specialty Company	4/1/1987
Anti-Seize	MSDS-00942	1216	Tek Chemical	11/10/1988
Anti-Seize	MSDS-00238	5443	TEK Chemicals	
Anti-Static Fluid, Document Handler Anti-Static Fluid	MSDS-00966	10520	Xerox Corporation	1/6/1997
Armor Clad	MSDS-00085		Dymon, Inc.	3/8/1989
Assure	MSDS-00950	5289	Triple S	12/27/1995
ATF Type FA	MSDS-00274	3869	Ashland Inc	
Auto Spra-Strip Paint Remover	MSDS-00211		Spra' Strip	
Automobile Cleaner Wax	MSDS-00868		Meguiar's	4/1/1986
B,Q-268 Armor Clad	MSDS-00776		Dymon, Inc.	3/8/1989
Battery Electrolyte	MSDS-00089		Exide Corp	
Battery Electrolyte	MSDS-00092		Ford Motor Co	5/13/1991
Battery Electrolyte	MSDS-00815		Exide Corporation	5/31/1986
Battery Electrolyte	MSDS-00822		Landmark Ford	5/31/1991
Battery Electrolyte	MSDS-00824	8813	Ford Motor Company	5/13/1991
Battery Electrolyte	MSDS-00825	8812	Ford Motor Company	5/13/1991
Battery Engine Starting	MSDS-00267	137	Johnson Controls	
Battey Electrolyte	MSDS-00827	8503	Ford Motor Company	3/30/1994
Big O	MSDS-00130	8257	Mt. Hood Chemical Corp	4/16/1991
Big O	MSDS-00861		Mt. Hood Chemical Corporation	4/16/1991
Black Dry Ink/Toner	MSDS-00975		Xerox Corporation	3/1/1994
Black, White, Bronze & Aluminum Silicones	MSDS-00959		VersaChem Corporation	1/1/1994
Boggie	MSDS-00773	964	Drummond American Corporation	12/1/1995
Bolt Airborne For Flying Insects	MSDS-00105		S.C. Johnson and Sons, Inc.	1/31/1989
Bolt Airborne For Flying Insects	MSDS-00849		S.C. Johnson & Son, Inc.	1/29/1987
Bond Tec Quick Weld Activator	MSDS-00929		Tremco Autobody Technologies	4/25/1995
Bonding Prep	MSDS-00931		Tremco Autobody Technologies	5/3/1995
Bondtite Rubberized Fast Dry Undercoat	MSDS-00182		Oatey Co.	5/6/1986
Bondtite Rubberized Fast Dry Undercoat	MSDS-00882		Oatey Co.	5/6/1986
Brake Block Rear XX 10"	MSDS-00017	2613	Cooper Industries	1/4/1995
brake clean	MSDS-00808	191	DuPont Chemicals	8/13/1992
Brake Fluid	MSDS-00946	6997	Quaker Oil Company	12/20/1988
Broadleaf Herbicide	MSDS-00046	8406	PBI/Gordon Corp	5/4/1995
C2 Rinse Arch Additive	MSDS-00094		Formula Corp.	10/12/1992
C2 Rinse Arch Additive	MSDS-00820		Formula Corp.	10/12/1992

Calcium Chloride Pellets 90 (Bulk)	MSDS-00794		Dow Chemical U.S.A.	10/16/1985
Calco HDMO 15W-40	MSDS-00067		Chevron USA Products Company	1/31/921
Calco HDMO 15W-40	MSDS-00757		Chevron Environmental Health Center Inc.	1/31/1992
Carb-Cleaner 8700	MSDS-00073	1217	N.A.P.A. Genuine Auto Parts	11/1/1985
Cartridge Ink Red Postalia 7500	MSDS-00035	8636	Inmont Corp	7/8/1980
Caulk Window Weld Resealant 8634	MSDS-00249	5971	3M Center	
Cement J-B Weld	MSDS-00243	8625	J.B. Weld Company	
Centari & Lutice Basemakers	MSDS-00806		DuPont Co.	1/1/1994
Centari 5000 Enamel	MSDS-00777	9109	DuPont Co.	10/19/1995
Centari Acrylic Enamel	MSDS-00809		DuPont Co.	1/1/1995
CFR Defoam	MSDS-00763		CFR Corporation	6/11/1992
Chain Life (Aerosol)	MSDS-00762		Champions Choice, Inc.	6/30/1986
Chain Life Aerosol	MSDS-00062		Champion Choice	
Chemcoa	MSDS-00761		Chemical Corporation Of America	6/19/1992
Chemcoa CS-2097	MSDS-00063		Chemical Corporation of America	
Chemguard ABC Dry Chemical	MSDS-00769		Chemguard Incorporated	5/22/1996
Chlorodifluoromethane - CHCIF2 Halocarbon 22	MSDS-00738	191	Airgas Inc.	10/31/1996
Chroma One High Solids Binders, Tints, Activators and Reducer	MSDS-00781		DuPont Co.	1/1/1994
Chromabase Basemakers	MSDS-00782	8274	DuPont Co.	1/24/1996
Chromasystems Binders, Tints	MSDS-00783	8430	DuPont Co.	1/24/1996
Chrome & Glass Polish 314 & 504	MSDS-00157	9754	B.K.B. Automotive Cosmetics, Inc.	11/22/1985
CIT O HAND CL/P	MSDS-00964		Valvoline Oil Company	4/9/1990
Cleaner and Restorer Vinyl	MSDS-00160		3M Center	11/1/1995
Cleaner Battery	MSDS-00753	5023	CRC Chemicals	11/1/1985
Cleaner Battery Carquest	MSDS-00767	1212	CRC Industries	6/17/1997
Cleaner Carpet SSS	MSDS-00915	5361	S.C. Johnson and Sons, Inc.	4/15/1992
Cleaner Contact 113	MSDS-00074	3881	CRC Chemicals	11/1/1985
Cleaner CRT & PlexiGlas	MSDS-00844	5503	S.C. Johnson Wax	9/9/1991
Cleaner Electrical	MSDS-00306	1215	CRC Chemicals	
Cleaner Fuel Injection	MSDS-00280	7597	CRC	
Cleaner Glass	MSDS-00327	9848	The Butcher Company	
Cleaner Glasses Lens Wipe	MSDS-00313	9630	Magic Safety Products	1/3/1996
Cleaner Graffiti Out	MSDS-00356	7919	Specialty Coatings & Chemicals	
Cleaner Hand Paint Buster 5975	MSDS-00251	6168	3M Center	
Cleaner Liquid Defoamer	MSDS-00342	12328	S.C. Johnson Commercial Markets,Inc	
Cleaner Non - Chlorinated	MSDS-00338	12429	CRC Chemicals	

Cleaner Wildcat 55 gal Drum	MSDS-00009	9978	Mt. Hood Chemical Corp	8/31/1995
Clear Enamel Topcoats	MSDS-00801	8999	DuPont Co.	1/1/1995
Clear Epoxy Resin Tube	MSDS-00155	6711	Versachem Corp	1/1/1994
Clear Vue	MSDS-00145		Mt. Hood Chemical Corp	8/16/1991
Compound Rubbing	MSDS-00355	6607	3M Center	
Compounds, Body Filler, Putties, Polishes	MSDS-00780		DuPont Co.	1/1/1994
Compressor Oil Emrarox RL	MSDS-00097		ICI Americas Inc.	11/15/1991
Conquest	MSDS-00131	4706	Mt. Hood Chemical Corp	9/19/1995
Conquest	MSDS-00869	4706	Mt. Hood Chemical Corporation	9/19/1995
Crew	MSDS-00041	5619	S.C. Johnson	3/20/1996
Cronar Basemakers (9355S, 9365S, 9385S)	MSDS-00771		DuPont Co.	1/1/1994
Cronar Clears	MSDS-00786		DuPont Co.	1/1/1994
Cronar Reducers/ Additives/ Initiators	MSDS-00785		DuPont Co.	1/1/1994
Cronar Tints, Balancers, Binders	MSDS-00787		DuPont Co.	1/1/1994
Crossbow Herbicide	MSDS-00357	12896	DowAgroSciences	
Crown	MSDS-00019	6421	Mt. Hood Chemical Corp	8/31/1995
Crystal	MSDS-00178	9848	Mt. Hood Chemical Corp	8/31/1995
D-Q23 Developer	MSDS-00939		Tomoegawa Paper Co., Ltd.	11/15/1993
De-Icer	MSDS-00943	1344	Technical Chemical Company	12/20/1988
Defoam	MSDS-00061		CFR Corporation	6/11/1992
Degreaser Steam Cleaning Formula 560	MSDS-00727	4945	Associated Chemist, Inc.	5/25/1996
Delo 400 15/40	MSDS-00012	5	Chevron USA Products Company	9/27/1994
Deluxe Marker	MSDS-00910		Sanford Corporation	8/18/1987
Deluxe Marker - Black	MSDS-00199		Sanford Corporation	8/18/1987
Deodorant Cakes - 24oz.	MSDS-00922	6758	Triple S	4/19/1990
Deodorant Water soluable Apple	MSDS-00288	6797		
Disc Brake Quiet	MSDS-00308	7495	CRC Chemicals	9/1/1989
Disk Brake Squeal Silencer	MSDS-00742	555	Bowman Distribution, Barnes Group Inc.	6/11/1986
Document Centre 220DC/230DC/220ST/230ST	MSDS-00968		Xerox Corporation	3/18/1997
DocuTech 90 / DocuPrint 390 Developer	MSDS-00955		Xerox Corporation	8/11/1997
DocuTech 90 / DocuPrint 390 Toner, Class V Dry Ink	MSDS-00957		Xerox Corporation	9/9/1997
DocuTech Model 90 Cleaner	MSDS-00958		Xerox Corporation	3/17/1997
Donax (R) TG Fluid	MSDS-00148	4	Shell	9/10/1995
Dow Cornings 33 Ext. Low Temp Bearing Grease-Med	MSDS-00803		The Dow Chemical Company	3/12/1990
Dulux Alkyd Enamel	MSDS-00805		DuPont Co.	1/1/1994

Dura 141 A/C Flush Solvent	MSDS-00149		Micro Care	
Duramix 4176	MSDS-00272	10238	Polymer Engineering Corp	10/29/1998
Duramix 4188	MSDS-00028	7250	Polymer Engineering Corp	7/1/1995
Duramix 4208, 4209, 4215, 4226,, 4127, 4210, 5000, 5108, Part B	MSDS-00883		Polymer Engineering Corp.	9/1/1992
Duramix 4227 Part A	MSDS-00255	10173	Polymer Engineering Corp	
Duramix 4320 Part A & Part B	MSDS-00775	7255	Polymer Engineering Corp.	4/15/1997
Duramix Adhesive Promoter	MSDS-00333	10240	Polymer Engineering Corp	
Duramix Filler Skin coat	MSDS-00326	10239	Polymer Engineering Corp	
DuraMix Sealer	MSDS-00336	11888	Polymer Engineering Corp	
Duramix Semi-riged Plastic REpair	MSDS-00325	7252	Polymer Engineering Corp	
Duramix SMC Fiberglass Backer Repair	MSDS-00029	7253	Polymer Engineering Corp	5/1/1995
Durex 50/50 Mix Antifreeze	MSDS-00070	4529	Christenson Oil	7/25/1995
Durex 50/50 Mix Antifreeze	MSDS-00755	4529	Christenson Oil	7/25/1995
Durex AP gear 80-90	MSDS-00129		Morrison Oil Company, Inc	11/4/1985
Durex AP Gear 80-90	MSDS-00862		Morrison Oil Company, Inc.	11/4/1985
Durex Truck and Bus Antifreeze	MSDS-00128		Morrison Oil Company, Inc	10/18/1990
Durex Truck And Bus Antifreeze	MSDS-00863		Morrison Oil Company, Inc.	10/18/1990
Dyn-O-Melt	MSDS-00747	6288	Cargill Incorporated - Salt Division	7/1/1993
Electric Motor and Parts Cleaner	MSDS-00060		CRC Industries, Inc.	
Electric Motor And Parts Cleaner	MSDS-00764		Carquest Corp.	12/17/1993
Emrarox RL 118D (Compressor Oil)	MSDS-00842		ICI Americas Inc.	11/15/1991
Enamel Primers	MSDS-00791	6768	DuPont Co.	1/1/1995
Enamel Reducers	MSDS-00798		DuPont Co.	1/1/1995
Exide Secondary Storage Battery	MSDS-00814		Exide Corporation	5/31/1986
Expo Dry Erase Markers Ultra Fine Tip	MSDS-00197		Sanford Corporation	12/20/1994
Expo Dry Erase Markers Ultra Fine Tip	MSDS-00911	7613	Sanford Corporation	12/20/1994
Expo II Dry Erase Markers	MSDS-00162	5686	Sanford Corporation	1/24/1996
Expo White Board Cleaner	MSDS-00912	5321	Sanford Corporation	5/31/1985
F-Matic Apple Fragrance REfill	MSDS-00087		Eikosha Co., LTD	
F-Matic Refill Fragrance i.e. Apple/Crusair	MSDS-00817		Eikosha Co., Ltd.	
FC Carnuba Wax Mix 55 Dr	MSDS-00093		Formula Corp.	10/9/1990
FC Carnuba Wax Mix 55 Dr.	MSDS-00821		Formula Corp.	10/9/1990
Ferrous Sulfate Monohydrate	MSDS-00358	12897		
Ferti-Lome Liquid Iron	MSDS-00920	8409	Voluntary Purchasing Goups, Inc.	7/1/1990
Fertilizer Dursban Combo	MSDS-00245	6669	Wilbur Ellis	
Fertilizer Rhode Top Dressing	MSDS-00269	6670	Vigoro Industries	
Fertilizer Surflan Oryzalin	MSDS-00084	7848	DowElanco	1/27/1995

Fiberglass Mat DYN 688	MSDS-00349	10492	U.S. Chemical & Plastics, Inc	
Fiberglass Resin	MSDS-00923		U.S. Chemical & Plastics, Inc.	1/22/1991
Fiberglass Resin	MSDS-00316	8523	U.S. Chemical & Plastics, Inc	7/12/1995
Filler Body Z-Grip Lightweight 282/284	MSDS-00244	11744	Fiber Glass-Evercoat Co., Inc.	3/22/1993
Filler Kitty Hair	MSDS-00315	6470	Dynatron/Bondo Corp	
Flares 20-30 minute	MSDS-00252	4937	Orion Marine Signal Products (Formerly OLN)	
Flectronic Cleaner #05013, 05014	MSDS-00751		CRC Chemicals	11/1/1985
Fluid Brake Gallon	MSDS-00339	9929	Olin Corp.	
Formula 540	MSDS-00143		Mt. Hood Chemical Corp	11/1/1985
Formula 560	MSDS-00144		Mt. Hood Chemical Corp	
Fortify	MSDS-00106		S.C. Johnson and Sons, Inc.	12/6/1991
Fortify	MSDS-00848		S.C. Johnson Wax	2/26/1991
Freon R12 Air Conditioning	MSDS-00175	603	Valvoline Oil Company	3/4/1986
Galvanized Sheet-HSLA Steel (Hot Dipped)	MSDS-00925		USS	1/1/1990
Gasket Remover	MSDS-00956	2475	VersaChem Corporation	1/1/1994
Gel Graffiti Remover	MSDS-00741		Bowman Distribution, Barnes Group Inc.	8/27/1987
Gel Graffitti Remover	MSDS-00058		Borden	8/27/1987
General Purpose Solvent	MSDS-00887	6061	PPG Industries, Inc.	10/8/1996
Glow Coat	MSDS-00132	4962	Mt. Hood Chemical Corp	11/1/1985
Glue E44 Pavement Tape	MSDS-00049	9561	3M Center	6/6/1999
Glue Stick	MSDS-00077		Dennison Division - Avery-Dennison Inc	11/1/1994
Glue Stick	MSDS-00793		Dennison Division, Avery-Dennison Inc	11/1/1994
Good Bye	MSDS-00133	4965	Mt. Hood Chemical Corp	11/1/1985
Good Bye	MSDS-00870	4965	Mt. Hood Chemical Corporation	8/31/1995
Grain Alcohol	MSDS-00867		Midwest Grain Products Co.	11/15/1985
Grease Dura-lith EP 2	MSDS-00756	7075	Chevron Environmental Health Center Inc.	12/5/1984
Grease Farebox	MSDS-00332	4475	Wurth USA Inc	
Grease Heavy Duty 1	MSDS-00065		Chevron USA Products Company	9/16/1989
Grease Heavy Duty 1	MSDS-00759		Chevron	9/16/1989
Grease Multi-Pack EP2	MSDS-00221	11071	Texaco	
Grease Multi-Purpose	MSDS-00220	5336	Amsoil Inc, Superior, WI	
Grease SRI- NLGI 2	MSDS-00219	6893	Chevron USA Products Company	
Hammer	MSDS-00134	4945	Mt. Hood Chemical Corp	8/31/1995
Hammer	MSDS-00871	4945	Mt. Hood Chemical Corporation	8/31/1995

Hammerite - Oil Base	MSDS-00835	6898	Hammerite Hunting Specialty Products, Inc.	4/1/1989
Hardner Cream Tube	MSDS-00242	7103	Dynatron/Bondo Corp	
Hardner Gloss Overall 793S	MSDS-00229	3939	Du Pont	
Hardner Liquid 411	MSDS-00774	8296	Dynatron/Bondo Corporation	9/12/1995
Hardners, Additives	MSDS-00796	5464	DuPont Co.	8/17/1995
Heavy Duty Drum Brake Segments and Blocks	MSDS-00730		Allied-Signal Inc.	6/15/1989
Helium	MSDS-00924		Union Carbide Canada Limited Linde Division	9/1/1988
HP print cartridge	MSDS-00004	8546	Hewlett- Packard Co	9/15/1994
Hybond	MSDS-00884		Pierce & Stevens	8/15/1995
Hybond Adhexives	MSDS-00187		Pierce & Stevens	8/15/1995
Hydrogen Peroxide	MSDS-00047	9896	Van Waters & Rogers Inc	4/3/1998
ice melt	MSDS-00754		CRC Chemicals	11/1/1985
Ice Melting Compound	MSDS-00078	6288	Dow Chemical U.S.A.	
IEC 600 Deflocculant	MSDS-00837		InVire Chem, Inc.	4/1/1992
IEC 814 Foam Suppressant	MSDS-00838		InVire Chem, Inc.	4/1/1992
Imron 192S	MSDS-00222	543	Du Pont	
IMRON 5000	MSDS-00223	9862	Du Pont	
Imron 5000 Polyurethane Enamels	MSDS-00779	9107	Du Pont	1/1/1995
Imron 6000 Basecoat/Clearcoat	MSDS-00778		DuPont Co.	1/1/1994
Imron Polyurethane Enamel	MSDS-00802	7147	E.I. DuPont de Nemours & Co., Inc.	1/1/1993
IMRON-5000 189S	MSDS-00224	503	Du Pont	
Ink CartridgePit/Bow E210/E590	MSDS-00283	10225	Pitney Bowes	
J Wax Hi-Suds Vehicle Cleaner	MSDS-00109		S.C. Johnson and Sons, Inc.	6/29/1990
J-Shop 600 Cleaner	MSDS-00107		S.C. Johnson and Sons, Inc.	4/13/1993
J-Shop 600 Cleaner	MSDS-00847		S.C. Johnson & Son, Inc.	3/2/1993
J-Wax Believe	MSDS-00108	4601	S.C. Johnson and Sons, Inc.	3/20/1991
J-Wax Believe	MSDS-00846	4601	S.C. Johnson Wax	1/12/1990
J-Wax Hi-Suds Vehicle Cleaner	MSDS-00845		S.C. Johnson Wax	6/29/1990
Jet Lume	MSDS-00135	6727	Mt. Hood Chemical Corp	8/31/1995
Jet Lume	MSDS-00872	6727	Mt. Hood Chemical Corporation	8/31/1995
Kreme & Kleen	MSDS-00136	4707	Mt. Hood Chemical Corp	
Kreme & Kleen	MSDS-00860	4707	Mt. Hood Chemical Corporation	6/1/1987
Krylon 1333 Tuner & Contact Cleaner	MSDS-00746		Consumer Products Division, Division of Borden, Inc.	11/22/1985
Krylon All-Purpose Silicone Spray	MSDS-00053		Borden	11/22/1985

Krylon All-Purpose Silicone Spray	MSDS-00745		Consumer Products Division, Division of Borden, Inc.	11/22/1985
Krylon Bright Silver Or Dull Aluminum	MSDS-00743		Consumer Products Divisio, Division of Borden, Inc.	11/25/1985
Krylon Bright silver or Dull Aluminum Aerosol spray Paint	MSDS-00056		Borden	11/25/1985
Krylon Int/Ext glossy white, blk, alpine green	MSDS-00055		Borden	12/4/1985
Krylon Spray Primer	MSDS-00054		Borden	11/25/1985
Krylon Spray Primer	MSDS-00744		Consumer Products Division, Division of Borden, Inc.	11/25/1985
Krylon Tuner & Contact Cleaner	MSDS-00052		Borden	
Lacquer Clears	MSDS-00812		DuPont Co.	1/1/1994
Lacquer Thinners and Cleaning Solvents	MSDS-00810		DuPont Co.	1/1/1995
Lead Acid Battery	MSDS-00830	4269	GNB Battery Technologies	
Lead-Acid Battery	MSDS-00118		Exide Corp	5/1/1991
Lead-Acid Battery	MSDS-00881		NAPA Batteries & Chargers	5/1/1991
Lectra Motive (Aerosol)	MSDS-00768	1215	CRC Industries	8/12/1996
Lectra Motive Cleaner	MSDS-00075		CRC Chemicals	11/1/1985
Lectra Motive Cleaner (Aerosol)	MSDS-00750		CRC Chemicals	11/1/1985
Lenox Band-Ade	MSDS-00050		American Saw & Mfg Company	10/1/1993
Lenox Band-Ade	MSDS-00857		American Saw & MFG. Company	10/1/1993
Lens and Mirror Cleaner	MSDS-00038	5764	Xerox Corp	4/26/1995
Lime Fertilizer	MSDS-00359	8424	HighCal Pellet Lime Co	
Liquid Paper Dryline Correction Fluid	MSDS-00828		Gillette Medical Evaluation Laboratories	10/25/1994
Lite-Dri #PLP201	MSDS-00180		New Pig Corporation	4/4/1991
Lite-Dri #PLP201	MSDS-00875		New Pig Corporation	4/4/1991
Loctite 271 threadlocker Stud N Bearing Mount	MSDS-00116		Loctite Corporation	
Loctite 271 Threadlocker Stud N' Bearing Mount	MSDS-00853		Loctite Corporation	5/12/1986
Loctite Bullseye Windsheild Repair Kit	MSDS-00850	4617	Loctite Corporation	10/20/1986
Loctite Bullseye Windshield Repair Kit	MSDS-00121	4617	Loctitie Corporation	11/20/1986
Loctite PST Pipe Sealant With Teflon	MSDS-00851		Loctite Corporation	5/12/1986
Loctite Red Thread Locker	MSDS-00279	1220	Loctite Corporation	6/11/1991
Low Temp Bearing Grease - Med	MSDS-00080		Dow Chemical U.S.A.	3/12/1986
Lube Chain - Wheelchair lifts	MSDS-00020	5164	Hydrotex Inc	8/16/1994
Lube Tire Mounting	MSDS-00344	9913	Warsaw Chemical Co	
Lubricant Stihil Chain and Bar	MSDS-00156	7178	Westland Oil Company	4/2/1995
Lubricating Oil	MSDS-00960	3868	Valvoline Oil Company	4/24/1986
Lubricating Oil	MSDS-00969	8788	The Valvoline Company	2/28/1996

Lubriplate Chain & Cable Fluid	MSDS-00826	10814	Fiske Brothers Refining Co.	6/1/1989
Lucite Acrylic Lacquer	MSDS-00813		DuPont Co.	1/1/1994
Magic Sanitizing Disinfectant	MSDS-00900	9630	Silicone/Stirling Paper Co.	6/13/1995
Metal Treatments, Lacquer Remover, Paint Remover	MSDS-00789		DuPont Co.	1/1/1994
Methanol Gas Line Antifreeze	MSDS-00944		Technical Chemical Company	9/19/1989
Mirror Glaze Cleaner	MSDS-00230	5086	Meguiar's	
Mirror Glaze Cleaner Wax	MSDS-00124	5085	Meguiar's	4/1/1986
Mirror Glaze Final Inspection	MSDS-00232	9050	Meguiar's	
Mirror Glaze New Car Glaze	MSDS-00231	6608	Meguiar's	
Mopar A/C Refrigerant - R12	MSDS-00765	603	Chrysler Motors Corporation	10/16/1997
Mopar Hypoid Gear Additive	MSDS-00748		Chrysler Motors Corporation	8/1/1988
Mopar Hypoid Gear Additive	MSDS-00770	2538	Chrysler Motors Corporation	9/1/1998
Muriatic Acid	MSDS-00142		Mt. Hood Chemical Corp	11/1/1985
Muriatic Acid	MSDS-00888	10862	All Pure Chemical Company	
Nalcool 3000 with Stabil-Aid	MSDS-00169		Nalco	1/13/1988
Nalcool 3000 With Stabil-Aid	MSDS-00879		Nalco	1/13/1988
Naturalizer Aerosol	MSDS-00172	6474	Chemsearch Div of NCH Corp	9/15/1993
Naturalizer Aerosol	MSDS-00880	6474	Chemsearch Div. of NCH Corp.	9/15/1993
NI-712 Orange and Strawberry	MSDS-00876		Neutron Industries, Inc.	11/1/1989
NI-712 Orange and Strawberry air freshener	MSDS-00179		Neutron Industries Inc.	11/1/1989
Nickel Based Alloy Steel	MSDS-00100		IRC Aluminum & Stainless	
Nickel Based Alloy Steel	MSDS-00840		IRC Aluminum & Stainless	6/15/1989
No. 201-207 Vulcanizing Fluid	MSDS-00889	8861	Remaco, Inc.	6/20/1986
NON-CLORINATED BRAKLEEN	MSDS-00348	12429	CRC Chemicals	
Norsac Fertilizer Dichlobenil	MSDS-00025	7847	PBI/Gordon Corp	1/12/1993
Oil 30 WT	MSDS-00285	3867	Ashland Inc	
Oil A/C Comp. 134A	MSDS-00290	9895	Moog Automotive	
Oil Delo 400 SAE 15W-40	MSDS-00069	3865	Chevron USA Products Company	9/27/1994
Oil Delo Heavy Duty Motor Oil SAE 40	MSDS-00066		Chevron USA Products Company	12/27/1990
Oil DELO Heavy Duty Motor Oil SAE 40	MSDS-00758		Chevron	12/27/1990
Oil Fuser Lubricant, Fuser Web, Fuser Wick, Fuser Roll	MSDS-00961		Xerox Corporation	11/5/1997
Oil Fuser Lubricant, Fuser Web, Fuser Wick, Fuser Roll	MSDS-00962		Xerox Corporation	11/5/1997
Oil Heavy Duty Cleaner	MSDS-00064		Chevron USA Products Company	12/5/1989
Oil Heavy Duty Cleaner	MSDS-00760		Chevron	12/5/1989
Orange Plus	MSDS-00917		Standardized Sanitaion Systems	6/10/1987

Orthene Systemic Insect Control	MSDS-00901	8863	The Solaris Group	12/24/1993
Paint coating flexible bumber	MSDS-00295	2411	SEM Products	
Paint Primer Surface	MSDS-00234	11823	Du Pont	
Paint Spray Black Gloss	MSDS-00903	3292	Sprayon Products	8/12/1986
Paint Spray Can White	MSDS-00302	314	Plasti-kote Co. Inc	
Paint Spray Can Black	MSDS-00281	3295	Plasti-kote Co. Inc.	
Paint Spray Can Black Gloss	MSDS-00319	3292	Plasti-Kote Co,Inc	5/23/1993
Paint Spray Can White	MSDS-00312	7784	Sherwin Williams	
Paint Zero Rust	MSDS-00309	12133	Amteco Inc.	1/1/1993
Pamsco Safety Orange	MSDS-00051		Amrep, Inc	10/13/1987
Pamsco Safety Orange	MSDS-00729		Amrep, Inc.	10/13/1987
Pen Paint GXP White	MSDS-00266		Sanford Corporation	
Pen Paint GXP White	MSDS-00341	6623	Sanford Corporation	
Pen Paint GXP Yellow	MSDS-00265	6622	Sanford Corporation	
PENETRANT OIL	MSDS-00261	2668	CRC Industries, Inc.	
Permatex Thread Sealant w/ Teflon	MSDS-00852	9057	Loctite Corporation	12/8/1986
Permatex thread Sealant w/Teflon	MSDS-00117	7198	Loctitie Corporation	12/8/1986
Peroxide,Hydrogen	MSDS-00318	10431	Van Waters & Rogers Inc	4/3/1998
Pipe Sealant with Teflon	MSDS-00119		Loctite Corporation	5/12/1986
Polish Spray w/ Lemon	MSDS-00324	5509	Triple S	
Power Steering Fluid	MSDS-00766	1209	The Costal Corporation	5/1/1997
Power Steering Fluid (Saginaw)	MSDS-00945		Technical Chemical Company	12/20/1988
Premium (High) Vacuum Pump Oil	MSDS-00891		Robinair Division SPX Corporation	12/21/1994
Premium Vacuum Pump Oil	MSDS-00191		Robinair	12/4/1992
Primer	MSDS-00273	5969	SEM Products	
Primer 285-50	MSDS-00351	12776	BASF Corporation	
Primer Epoxy	MSDS-00322	12267	R-M Diamont	
Primer Gray	MSDS-00311	136	Du Pont	
PRIMER SELF ETCHING	MSDS-00264	3324	Du Pont	
Primer Self-etching Light Gray	MSDS-00292	9619	Bondo Mar-Hyde Corp	
Primer Spray Rust Brakes	MSDS-00253	3950	Seymour of Sycamore	
Primer Surfacer Flexible 3913	MSDS-00908	2413	Sem Products	2/10/1986
Primer URO Reducer	MSDS-00788	135	DuPont Co.	2/1/1995
Primer Weld Through	MSDS-00303	12088	Auto Tech	
Pro Link Vandalism Remover	MSDS-00168	5233	Preferred Distributors, Inc.,	5/1/1995
Propane	MSDS-00034	6350	Ferrellgas	6/1/1993
Propane Cylinder	MSDS-00031	6350	Turner	9/6/1983

Protector Battery	MSDS-00874	1214	NOCO Company	4/4/1989
Punell Instant Antiseptic Hand Cleaner	MSDS-00834		Gojo Industries, Inc.	
Pyroil DI-11.5	MSDS-00967		The Valvoline Company	11/20/1996
Quick Weld Activator	MSDS-00948	5583	Transfer Autobody Technologies	10/16/1997
Quick Weld Gap Filler	MSDS-00927		Tremco Autobody Technologies	1/18/1995
Rain-X	MSDS-00935		Uneiko Corporation	
Reducer Chroma System	MSDS-00299	10843	Du Pont	
Reducer Epoxy Primer Low Temp	MSDS-00323	12269	R-M Diamont	
Reducer Imron Enamel	MSDS-00307	4139	Du Pont	
Refrigeration Oil	MSDS-00192		Robinair	5/8/1989
Refrigeration Oil	MSDS-00892		Robinair Division SPX Corporation	5/8/1989
Rite	MSDS-00141		Mt. Hood Chemical Corp	1/16/1991
Roundup Pro Herbicide	MSDS-00214	6967	Monsanto Company	11/1/1995
RU 2000 (R) Reg Unleaded Gas	MSDS-00210		Shell	5/11/1990
RU 2000 Regular Unleaded Gasoline	MSDS-00894		Shell	4/11/1990
Rubber Cement	MSDS-00011		Dennison Division - Avery-Dennison Inc	11/1/1994
Rust - Mort	MSDS-00241	7419	SEM Products	
Rust Raider	MSDS-00360	B5, B32, B34, B40,	Radiator Specialty Company	
Safety-Kleen 105 Solvent	MSDS-00195		Safety-Kleen Corp	
Safety-Kleen 105 Solvent	MSDS-00913		Safety-Kleen Corp.	3/18/1992
Safety-Kleen Premium Solvent	MSDS-00194		Safety-Kleen Corp	12/14/1993
Safety-Kleen Premium Solvent	MSDS-00904		Safety-Kleen Corp.	7/8/1993
Sanford's Expo Cleaner	MSDS-00196		Sanford Corporation	11/1/1985
Sanitizer Hand Cleaner	MSDS-00268	8427	Gojo Industries	
Sealant 8500	MSDS-00247	6482	3M Center	
Sealer Form-a-Gasket	MSDS-00291	3877	Loctite Corporation	
Sealer Glass Black	MSDS-00334	6862	3M Center	
Sealer Seam Body Flexiclear 8405	MSDS-00248	6169	3M Center	
Sealer Seam Duramix 4225	MSDS-00246	10172	Polymer Engineering Corp	
Sealer Urethane	MSDS-00304	12107	3M Center	
Secondary Storage Battery	MSDS-00090		Exide Corp	
Semi Gloss Enamel	MSDS-00866		Miller Paint Co., Inc.	11/25/1985
Semi-Metallic Automotive Disc Brake	MSDS-00739	5178	Brake Systems Inc.	7/31/1986
Sentry	MSDS-00140		Mt. Hood Chemical Corp	11/1/1985
Shell Donax TG Plus Fluid ATF	MSDS-00898		Shell	12/2/1991
Shell Kerosene - 2K	MSDS-00205		Shell	10/17/1985
Shell Kerosene - 2K	MSDS-00897		Shell	10/17/1985

Shell Low Sulfer Kerosene	MSDS-00895		Shell	10/11/1993
Shell Low Sulfur Kerosene	MSDS-00208		Shell	10/11/1993
Shell Low-Sulfur Dieseline (R)	MSDS-00206		Shell	10/15/1987
Shell Low-Sulfur Dieseline (R)	MSDS-00207		Shell	
Shell Low-Sulfurf Dieseline	MSDS-00896		Shell	11/3/1988
Shell Tellus (R) Oil 32	MSDS-00209		Shell	11/13/1991
Shell Tellus Oil 32	MSDS-00902		Shell	11/13/1991
Silicone Blue Tube	MSDS-00018	3507	Versachem Corp	1/1/194
Silicone Black Cartridge	MSDS-00275	1951	Loctite Corporation	3/16/1994
Silicone Black Cartridge 16C	MSDS-00026	1951	Versachem Corp	1/1/1994
Silicone Blue Aerosol 6MA	MSDS-00236	1191	Loctite Corporation	3/16/1994
SILICONE CLEAR CARTRIDGE	MSDS-00257	5274	Bowman Distribution, Barnes Group Inc.	
Silicone Dilectric	MSDS-00298	6950	Echlin	
Silicone Red Tube 26902	MSDS-00237	1189	Loctite Corporation	
Silicone RTV Clear	MSDS-00256	1218	Loctite Corporation	
Silicone Spray	MSDS-00277	3880	3M Center	11/26/1997
Silvaloy 45 (EI-2451)	MSDS-00816		Englehard Corporation	9/24/1984
Silver Solder	MSDS-00088		EngelHard Corp	9/24/1984
Simple Green	MSDS-00905	8256	Sunshine Makers, Inc.	3/1/1993
Soap Bus J600	MSDS-00276	5005	S.C. Johnson and Sons, Inc.	
Soap Cleaner Surgatol	MSDS-00287	10966	Mt. Hood Chemical Corp	
Soap Dish Washing	MSDS-00317	10679	S.C. Johnson Commercial Markets,Inc	5/15/1996
Soap Orange Plus	MSDS-00293	4602		
Soap Parts Washer Jet Lume	MSDS-00314	8023	Mt. Hood Chemical Corp	8/31/1995
SODIUM BICARBONATE	MSDS-00347	12872	Van Waters & Rogers Inc	4/25/1900
Soft Polyester Glazing Putty	MSDS-00163	6287	Fiber Glass-Evercoat Co., Inc.	8/9/1986
Solders	MSDS-00112		J. W. Harris Co., Inc.	4/1/1990
Solders	MSDS-00836		J.W. Harris Co., Inc.	4/1/1990
Solution S0770 N-1 Indicator	MSDS-00170		Nalco	1/26/1988
Solution S0771 - 2 Titrant	MSDS-00171		Nalco	1/26/1988
Solution SO770 N-1 Indicator	MSDS-00878		Nalco	1/26/1988
Solution SO771 -2 Titrant	MSDS-00877		Nalco	1/26/1988
Spar Enamel	MSDS-00126		Miller Paint Co. Inc.	11/25/1985
Spar Enamel	MSDS-00865		Miller Paint Co., Inc.	11/25/1986
Specialty Clears	MSDS-00811	9379	DuPont Co.	1/1/1995
Spill Master Absorbent	MSDS-00146	6613	Zimerlite	12/20/1996
Spirax (R) Heavy Duty Gear Oil 80W-90	MSDS-00043		Shell	

Spirax Heavy Duty Gear Oil 80W-90	MSDS-00048	1	Shell	12/22/1995
Spot Gone	MSDS-00139		Mt. Hood Chemical Corp	7/15/1991
SPRAY DECK LAWN MOWER	MSDS-00260	10941	ASTRO-TECK PRODUCTS	
Spray Wasp & Bee	MSDS-00328	10425	CRC Chemicals	
SSS Concrete Floor & Masonry Coating	MSDS-00926		Triple S	7/12/1990
SSS Emergency Clean-Up Pack	MSDS-00918		Triple S	6/1/1988
SSS Gum Remover II	MSDS-00919	5456	Triple S	7/19/1991
SSS Jelled Vandal Mark Remover	MSDS-00938	5233	Triple S	2/25/1997
SSS Lemon Spray Wax Polish	MSDS-00916		Standardized Sanitaion Systems	3/29/1988
SSS Rim Sticks (All Fragrances)	MSDS-00914		Triple S	1/1/1992
Stainless Steels	MSDS-00101		IRC Aluminum & Stainless	
Stainless Steels	MSDS-00839		IRC Aluminum & Stainless	
Starting Fluid	MSDS-00947	0084	Technical Chemical Company	12/20/1988
Starting Fluid	MSDS-00271	084	Radiator Specialty Company	
STATX	MSDS-00193		RTW International Corp	10/18/1990
Statx	MSDS-00890		RTW International Corp.	10/18/1990
Stihl Two-Cycle Engine Oil	MSDS-00899	7178	Specialty Oil Company	10/31/1990
Sullube 32	MSDS-00079	7141	Dow Chemical U.S.A.	7/26/1995
Sullube 32	MSDS-00797	7141	The Dow Chemical Company	7/26/1995
Sulphate Aluminum	MSDS-00096	8365	Great Western Chemical	12/1/1993
Super Glue	MSDS-00044	6642	Dynatron/Bondo Corp	3/24/1995
Super Sidewinder	MSDS-00772	9620	Drummond American Corporation	5/1/1992
Surface Guard	MSDS-00013	5593	Mt. Hood Chemical Corp	8/31/1995
Surflan A.S. Herbicide - Ornamentals	MSDS-00804	7848	DowElanco	1/27/1995
Surgatol RTU	MSDS-00008	5289	Mt. Hood Chemical Corp	8/31/1995
Synthetic Enamel, Tractor and Implement Enamels Aluminum Paints	MSDS-00799		DuPont Co.	1/1/1994
T-Q23 Toner	MSDS-00940		Tomoegawa Paper Co., Ltd.	11/15/1993
Technique Base Coat	MSDS-00111		S.C. Johnson and Sons, Inc.	1/23/1992
Technique Base Coat	MSDS-00843		S.C. Johnson Wax	8/30/1990
Teflon Dry Lube	MSDS-00059		Bowman Distribution, Barnes Group Inc.	5/6/1986
Teflon Dry Lube	MSDS-00740		Bowman Distribution, Barnes Group Inc.	5/6/1986
Thermoil	MSDS-00921		Thermo King Corporation	5/30/1989
Thermoil	MSDS-00949	8503	Thermo King Corporation	5/30/1989
Thinner Lacquer	MSDS-00282	2377	Du Pont	
THINNER LAQUER & ENAMEL	MSDS-00262	5813	Du Pont	

Threadlocker	MSDS-00235	6241	Loctite Corporation	6/18/1998
Throat Seal Liquid (TSL)	MSDS-00833		Graco Inc.	8/30/1991
Throat Seal Liquid TSL	MSDS-00095		Graco Inc.	8/30/1991
Thunderbolt	MSDS-00138		Mt. Hood Chemical Corp	11/1/1985
Tire new 12R22.5	MSDS-00353	206	Michelin, Uniroyal, B F Goodyear	
Tire new LT225/75R16	MSDS-00354	5346	Michelin, Uniroyal, B F Goodyear	
TKO REFER OIL ACID TEST KIT	MSDS-00305	6036	Virginia KMP Corp	
Toner Fax Machine	MSDS-00320	12160	Sharp Corporation	11/1/1997
Top Grit	MSDS-00886		Pace National Corporation	2/6/1991
Top Hand	MSDS-00885		Pace National Corporation	2/6/1991
Top-Grit	MSDS-00183		Pace National Corp	2/6/1991
Top-Hand	MSDS-00184		Pace National Corp	2/6/1991
Transmission Fluid	MSDS-00204		Shell	12/2/1991
Tri Tex	MSDS-00137		Mt. Hood Chemical Corp	
Trim Re-Nu Bumpers, Rubbers, Exterior	MSDS-00930	9994	Full Spectrum	5/12/1995
Trust X Cutoff Wheel	MSDS-00154		X-ergon, A partsmaster Co., Div of NCH	4/18/1991
Ultra-Duty Grease 2	MSDS-00068		Chevron USA Products Company	12/5/1984
Ultrasorb	MSDS-00127		Moltan Company	2/15/1993
Ultrasorb, Optisorb, 248, MP Fines and Flosafe	MSDS-00864		Moltan Company	2/15/1993
Undercoat Spray	MSDS-00278	6289	3M Center	
Undercoating Rubberized	MSDS-00240	5426	3M Center	
US Calrite PLS-5000	MSDS-00934		U S Chemical - A Division of Hydrite Chemical Co.	10/5/1993
VersaChem Anti-Seize & Threadlocker	MSDS-00954	21961	VersaChem Corporation	11/1/1985
Vinyl Enamels, Chassis Black	MSDS-00800		DuPont Co.	1/1/1994
Wash Plus Wax # 702	MSDS-00819		Fortech Products By Formula Corporation	6/1/1993
Wash Plus Wax #702	MSDS-00030	6594	Fortech Products by Formula Corp	6/1/1993
Wasser Mc-Aroshield	MSDS-00971		Wasser High-Tech Coatings Inc.	10/8/1993
Wasser MC-Thinner	MSDS-00970		Wasser High-Tech Coatings Inc.	10/8/1993
Water Spot Remover	MSDS-00158	9753	P & B Manufacturing Co	9/20/1991
WD-40	MSDS-00974		WD-40 Company	10/1/1993
Webfoot Weed & Feed 12-2-4	MSDS-00936	8468	United Horticultural Supply	4/1/1993
White Lithium Grease	MSDS-00076		CRC Chemicals	11/1/1985
White Lithium Grease (Aerosol #5037	MSDS-00749	3876	CRC Chemicals	11/1/1985
Wite-Out for everything Correction Fluids (Quick Dry)	MSDS-00152	5748	Wite-Out Products, Inc.,	3/30/1994

Wrought Aluminum Products, 5XXX Series Alloys	MSDS-00733		Aluminum Comany of America	12/31/1991
Wrought Aluminum Products, 6XXX Series Alloys	MSDS-00732		Alcoa Aluminum Company of America	12/31/1991
Xerox Fuser Agent	MSDS-00972		Xerox Corporation	2/11/1992
Zep Flash	MSDS-00166	4938	Zep Manufacturing	6/15/1988
Zimmerlite Granular Absorbent	MSDS-00007	6613	Roy P & Billie Jean Zimmerly	9/21/1990

IV- *HEARING CONSERVATION PROGRAM FORMS*

5.4.1 C-TRAN

ACKNOWLEDGMENT OF TRAINING RECEIVED

Employee Name: ________________________________ Date of hire: _______________________

Position Assigned: ______________________________ Dept: ____________________________

Subject: <u>Hearing Conservation</u>

The following information has been covered in this training session:

Overview of the Hearing Conservation Program ______ Job duties requiring hearing protection ___ ______ How the ear works ______ Location of hearing protection

_______ Noise characteristics ______ Audiometric Testing

_______ Effects of noise on hearing ______ Personal ear care

_______ Hearing protectors ______ Show video

_______ Hearing protection C off the job ______ Administer test

_______ Medical care ______ Acknowledgment of training signed

________________________________ _________________________

Maintenance Training Supervisor Date

I have received and understand the training given to me by C-TRAN on hearing conversation. I will be required to wear the following hearing protection, ________________________________, while performing the following job tasks:

____

____

__________________________________ ___________________________

Employee's Signature Date

V- *LOGOUT/TAGOUT FORMS*

C-TRAN

ACKNOWLEDGMENT OF TRAINING RECEIVED

Employee Name: ___________________________________ Date of hire: ___________________

Position Assigned: __________________________________ Dept: _________________________

Subject: Lockout/Tagout

The following information has been covered in this training session:

______	Review of the regulations	______	C-TRAN's lockout/tagout program
______	Types of energy sources	______	Equipment that is subject to lockout/tagout
______	Lockout vs. tagout	______	When to lockout
______	Authorized and affected employees	______	If authorized employee, lockout/tagout equipment is assigned.
______	Specific job duties requiring lockout/tagout	______	Six-step procedure—go through flow chart
______	Group lockout	______	Removal of locks and tags
______	Test administered	_______	Acknowledgement of training signed

___________________________________ ______________________________

Maintenance Training Supervisor Date

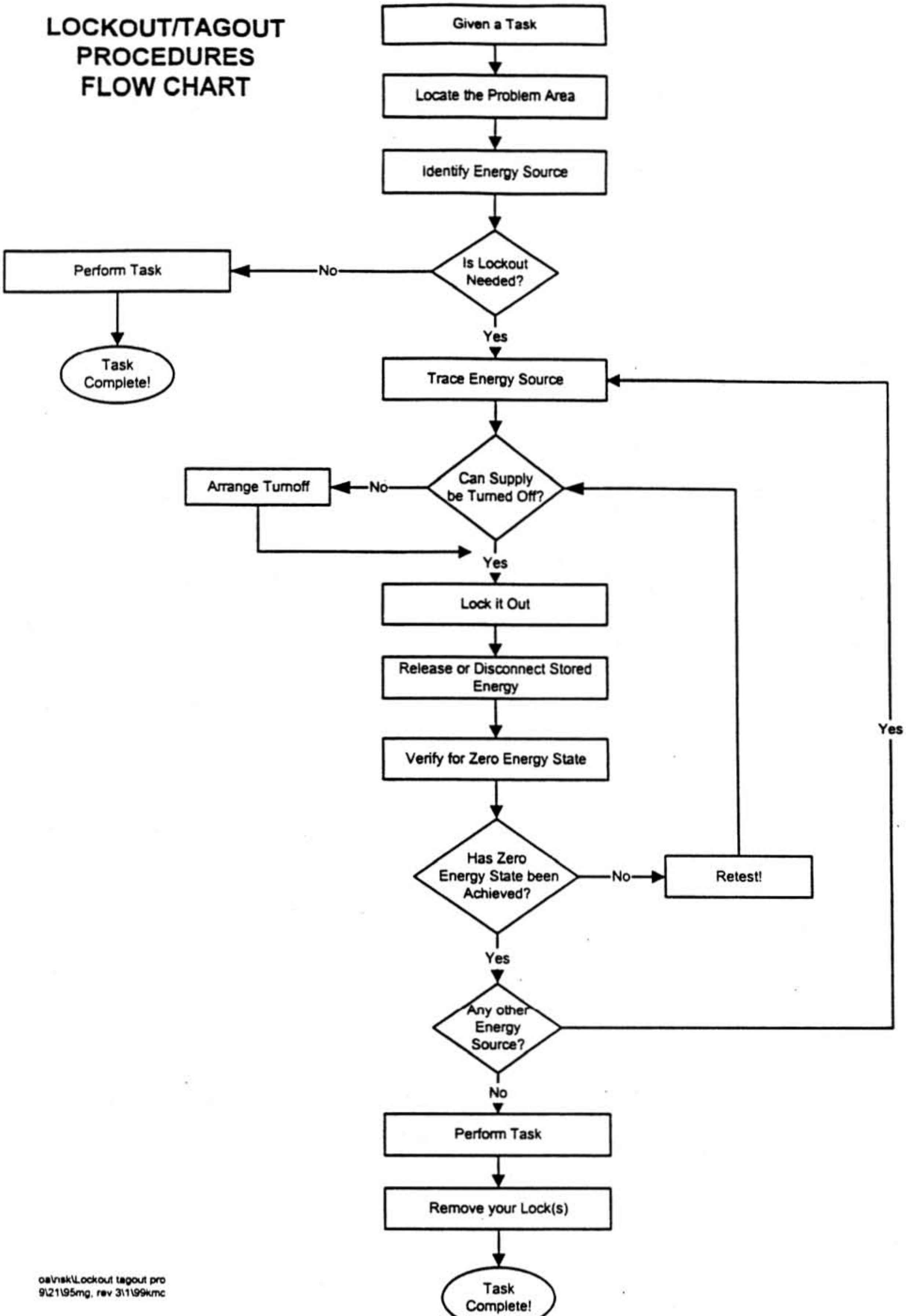
I have received and understand the training given to me by C-TRAN on lockout/tagout.

I will be an (affected or authorized) ____________________ employee. If authorized, I have been assigned a lock, tag and key for my use in performing the lockout/tagout procedure.

___________________________________ ______________________________

Employee's Signature Date

LOCKOUT/TAGOUT PROCEDURES FLOW CHART



oa\risk\Lockout tagout pro
9\21\95mg, rev 3\1\99kmc

PERIODIC LOCKOUT/TAGOUT

INSPECTION RECORD

Names of Authorized Persons Performing Inspection: Date of Inspection: ____________________

______________________________________ ____

______________________________________ ____

Authorized Employee(s) Performing Servicing or Repair:

____________________________ ____

____________________________ ____

____________________________ ____

Equipment Under Service or Repair:

____

Method used by the Authorized Employee(s):

____

5.4.1.1 Yes No

1. Are all employees on this job trained as authorized? ______ ______
2. Were the affected employees notified prior to the project start? ______ ______
3. Are all sources of energy secured, locked, and/or tagged out? ______ ______
4. Was the on/off switch returned to "Off" position following try out? ______ ______

We certify that any problems discovered during this inspection were reviewed with the authorized employees on this job during the inspection process.

______________________________________ ______________________________________
Authorized Employee Inspector

______________________________________ ______________________________________
Authorized Employee Inspector

______________________________________ ______________________________________
Authorized Employee Inspector

VI- *BLOOD BORNE PATHOGEN SAFETY FORMS*

C-TRAN
ACKNOWLEDGMENT OF TRAINING RECEIVED

Employee Name: ______________________________ Date: _________________________

Position Assigned: ____________________________ Dept: _________________________

Subject: Blood Borne Pathogens Training

I certify that I have received and understand the information and materials presented to me on the above subject matter.

____ ______________________________
Employee's Signature Date

****

I certify that the following information has been covered in this training session: Review of the regulatory text of the Blood Borne Pathogen Standard and explanation its contents, general discussion on blood borne diseases and their transmission, C-TRAN=s exposure control plan, engineering and work practice controls, personal protective equipment, Hepatitis B vaccine, response to emergencies involving blood, how to handle exposure incidents, the post-exposure evaluation and follow-up program, record keeping, sign/labels, and color coding requirements.

____ ______________________________
Instructor's Signature Date

Hours of Training Received: _____________

C-TRAN EMPLOYEE
BLOOD BORNE PATHOGEN
EXPOSURE REPORT FORM

Employee Name: ____

Position Worked at Time of Exposure: _________________________________

Date of Exposure: ____________________ Time of Exposure: _________________

Where the Incident Occurred: ____

Identification of Source (if available): ____

Route of Exposure (hands, eyes, cuts, etc.): ____

Your activities at time of exposure: ____

____

What was the cause of the incident? ____

____

____

Personal protective equipment used at the time of the incident: ______________________

____ ________________________________
Employee Signature *Date Signed*

____ ________________________________
Supervisor Signature *Date Received*

C-TRAN
BLOOD BORNE PATHOGENS
STANDARD/EXPOSURE CONTROL PLAN

EXPOSURE INCIDENT INVESTIGATION FORM

If one of our employees is involved in an incident in which exposure to blood borne pathogens may have occurred, there are two things on which we immediately focus our efforts:

- making sure that our employees receive medical consultation and treatment (if required) as expeditiously as possible.

- investigating the circumstances surrounding the exposure incident.

The **immediate supervisor** will investigate every exposure incident that occurs in their facility using the Exposure Incident Investigation Form on the other side of this form. This form is in addition to the Accident Report Form which must be completed by the employee. This investigation will be done immediately after the incident occurs and involves gathering the following information:

- when the incident occurred (date and time)

- where the incident occurred (location)

- what potentially infectious materials were involved in the incident (type of material, blood, body fluid, needles, etc.)

- the routes of exposure (hands, eyes, cuts, etc.)

- circumstances under which the incident occurred
    < type of work being performed

- how the incident was caused
    < accident
    < unusual circumstances (such as equipment malfunction, power outage, etc.)

- personal protective equipment being used at the time of the incident

- actions taken as a result of the incident
    < employee decontamination
    < cleanup
    < notifications made

The Exposure Incident Investigation Form must be completed by the immediate supervisor, approved by the appropriate department manager, and turned in to the Director of Administrative Services immediately. The form will be kept in a confidential employee file.

EXPOSURE INCIDENT INVESTIGATION FORM - Part 2

Employee ______________________________ Position: __________________________

Date of Incident: ________________________ Time of Incident: __________________

Location: ______________________________

POTENTIALLY INFECTIOUS MATERIALS INVOLVED:

Type: __________________________________ Source: __________________________

Route of Exposure: ____

____

Circumstances (work being performed, etc.): ______________________________________

How Incident Was Caused (accident, equipment malfunction, etc.): __________________

Personal Protective Equipment Being Used: ____

Actions Taken (decontamination, cleanup, reporting, etc.): __________________________

Recommendations for Avoiding Future Occurrences: ___________________________________

____

Attach additional pages, if necessary.

______________________________ ______________________________
Immediate Supervisor *Date*

______________________________ ______________________________
Department Head *Date*

______________________________ ______________________________
Director of Administrative Services *Date*

C-TRAN
BLOOD BORNE PATHOGEN STANDARD/EXPOSURE CONTROL PLAN
POST-EXPOSURE CHECKLIST

The following steps must be taken, and information transmitted, in the case of an employee=s exposure to blood borne pathogens.

Employee: ____

Position: ____

ACTIVITY	COMPLETION DATE	BY
Employee Exposure Report Form received		
Employee furnished with documentation regarding exposure incident (Investigation Form)		
Source individual identified ______________________ (source individual)		
Source individual=s blood tested and results given to exposed employee _______ Consent has not been obtained		
Exposed employee=s blood collected and tested		
Appointment arranged for employee with Northwest Occupational Medical Clinic for evaluation and counseling	______________ Appointment Time/Date	

The following documentation must be forwarded prior to employee=s appointment to:

Northwest Occupational Medical Clinic
4421 St. Johns Road, Suite D
Vancouver, WA 98661

______ Blood Borne Pathogen Standard

______ Exposed employee=s job description

______ Copy of Employee Exposure Report Form

______ Copy of Exposure Incident Investigation Report

______ Results of the source individual=s blood test (if available)

______ Copies of exposed employee=s medical records

C-TRAN
CONSENT OR DECLINE FORM
HEPATITIS B VACCINE

______________________________ ______________________________
Employee Name (Please Print) Social Security Number

HEPATITIS B VACCINATION CONSENT

I have had the opportunity to ask questions of a licensed health care profession regarding the Hepatitis B disease, and I have read the immunization information and understand the risks of the immunizations. I know that, as with all immunizations, there may be vaccine side effects, and there is no guarantee that I will become immune. I also know that I must receive three (3) doses to achieve immunity.

______________________________ ______________________________
Employee Signature Date

______________________________ ______________________________
Witness Signature Date

First Vaccine: Date Received: ______________

Second Vaccine: Date Received: ______________

Third Vaccine: Date Received: ______________

****

DECLINE OF VACCINATION FOR HEPATITIS B (Mandatory Wording)

I understand that due to my occupational exposure to blood or other potentially infectious materials, I may be at risk of acquiring Hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with Hepatitis B vaccine at no charge to myself. However, I decline Hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring Hepatitis B, a serious disease. If, in the future, I continue to have occupational exposure to blood or other potentially infectious materials, and I want to be vaccinated with Hepatitis B vaccine, I can notify C-TRAN and receive the vaccination series at no charge to me.

______________________________ ______________________________
Employee Signature Date

______________________________ ______________________________
Witness Signature Date

VII- *FACILITY SAFETY INSPECTION FORMS*

*DATE OF INSPECTION: ________________
INSPECTED BY: _______________________

1. FUEL ISLAND

FUEL PUMPS

Ok Action Needed

G G Covers, guards and shields are installed and in good working order on the gas pump.

G G All safety devices on fuel nozzles and triggers are in working order.

G G Fuel nozzles, piping, filters, and hoses are free from any leakage.

____

____

STANDBY GENERATOR

Ok Action Needed

G G Covers, guards, and shields are installed and covering all moving parts.

G G Area around generator is clear so as not to obstruct generator in case of a start-up.

G G General maintenance is okay; no oil leaks are visible.

____

____

FLUID DISPENSER LINES

Ok Action Needed

G G All lines are leak-free and will not cause a hazardous working condition.

G G All dispensary lines are retracted in their reels and all reels retract properly.

G G Safety devices and releases on all nozzles and triggers are in good working order.

____

____

LARGE VACUUM CLEANER

Ok Action Needed

G G All hoses and lines are in good working order and not obstructing work area.

G G Vacuum cleaner hoses are in good condition.

G G Filters checked and/or changed regularly. (Ask employer working in area/or check log).

G G Are hearing protection signs posted around this equipment?

____

____

AIR COMPRESSOR

Ok Action Needed

G G Covers, guards, and shields are installed and in good working order.

G G Air tank is free from metal fatigue, rust and air leaks.

G G General maintenance okay and no visible oil leaks.

G G Air compressor is securely bolted to the ground.

____

____

FIRST AID EQUIPMENT

Ok Action Needed

G G Are first aid kits easily accessible to work area, with necessary supplies available, periodically inspected and replenished as needed?

G G If eye wash is present, is it in good working order?

G G Do displays for first aid have proper signage and is area around display unobstructed?

FIRE PROTECTION

Ok Action Needed

G G Fire extinguishers checked for proper mounting, testing dates, size and fullness.

G G Area around fire extinguisher is unobstructed.

G G Are flammable materials stored in the proper areas?

G G Fire protection location signs, exits, and warnings are easily visible and properly placed.

HOUSEKEEPING

Ok Action Needed

G G Floors and walkways are free of clutter, clean and have proper markings for safety.

G G Area has proper lighting and ventilation.

G G Area around disposal equipment is clean and free from clutter.

G G Working equipment and cleaning material is properly stored and does not obstruct working area.

G G Is area free of slipping hazards such as spilled fuel?

MISCELLANEOUS

Ok Action Needed

G G Are proper personal protective equipment (gloves, ear plugs, etc.) available and being used? (Ask employee)

---

2. BUS WASH BUILDING

Ok Action
Needed

G G Area is clean, free of clutter and has proper markings for safety.

G G Cleaning brushes/equipment in good working order.

____

____

R/O (REVERSE OSMOSIS) ROOM

Ok Action
Needed

G G Area is clean, free of clutter and has proper safety markings.

G G Air compressor is securely bolted to the floor.

G G Covers, guards and shields are installed and in good working order.

____

____

PUMP ROOM/WATER RECYCLING ROOM

Ok Action
Needed

G G Area is clean, free of clutter and has appropriate safety markings.

G G Is belt guard in place on pressure washer?

____

____

FIRE PROTECTION

Ok Action
Needed

G G Fire extinguisher checked for proper mounting, testing date, size and fullness.

G G Area around fire extinguisher is unobstructed.

G G Are flammable materials, chemicals and other flammables stored in the proper areas?

G G Fire protection location signs, exits, and warnings are visible and properly placed.

____

____

3. BRAKE AND TIRE ROOM

BRAKE LATHE

Ok Action Needed

G G Covers, guards and shields are installed and in good working order.

G G Personal protective equipment (safety goggles/ shields) available and being used by employees.

G G Vacuum system is operational.

G G Machine is clean and free of oil leaks.

GRINDING WHEEL

Ok Action Needed

G G Wheels on grinder are in good working order. They are not cracked or worn.

G G Guards for grinding wheel are close to wheel when in use.

G G Proper personal protective equipment (safety glasses, shields) are available and used by employees.

G G Area around grinding wheel is clean and free of obstruction.

G G Are grinding wheel tool rests set to within 1/8 inch or less of the wheel?

CHASSIS LIFT/FRAME LIFT

Ok Action Needed

G G Rear lift supports are not bent, broken or damaged.

G G There is no hydraulic fluid leaks around the lift and motor areas.

SAFETY JACKS AND STANDS

Ok Action Needed

G G Jack stands are free of cracks and broken or bent supports.

G G Jack stands in tire room, and brake room areas.

G G Safety jacks and stands are available for use when necessary.

FLUID DISPENSER LINES

Ok Action Needed

G G All lines are leak free and there are no signs of hazardous spills around fluid lines.

G G Fluid lines are retracted in their reels and reels are in good working condition.

G G All nozzles, triggers, and safety devices are in good working order.

FIRE PROTECTION

Ok Action Needed

G G Fire extinguisher checked for proper mounting, testing dates, size and fullness.

G G Area around fire extinguisher is unobstructed.

G G Are flammable materials, chemicals and other flammables stored in the proper areas?

G G Are overhead sprinkler systems intact and free of leaks?

G G Fire protection location signs, exits, and warnings are visible and properly placed?

HOUSEKEEPING

Ok Action Needed

G G Floors are clean and unobstructed.

G G Waste is disposed of properly.

G G Working materials are properly stored and do not obstruct working area.

G G Area has proper ventilation and lighting.

MISCELLANEOUS

Ok Action Needed

G G Electrical cords, outlets and plugs are free from frayed, burnt or bad wiring and connections.

G G Pull cord lights are free from bad or frayed wires and plugs.

FIRST AID

Ok Action Needed

G G Is chemical eye wash station on wall, unobstructed and properly stocked?

4. UPSTAIRS TIRE ROOM STORAGE

HOUSEKEEPING

Ok Action Needed

G G Floors are clean and unobstructed.
G G Waste is disposed of properly.
G G Working materials are properly stored and do not obstruct working area.
G G Area has proper ventilation and lighting.

____

____

WATER TANK FOR TIRE TESTING

Ok Action Needed

G G Area around tank is unobstructed.

____

____

FIRE PROTECTION

Ok Action Needed

G G Fire extinguisher checked for proper mounting, testing dates, size and fullness.
G G Area around fire extinguisher is unobstructed.
G G Are flammable materials, chemicals and other flammables stored in the proper areas?
G G Are overhead sprinkler systems intact and free of leaks?
G G Fire protection location signs, exits, and warnings are visible and properly placed?

____

____

FIRST AID

Ok Action Needed

G G Is chemical eye wash station on wall, unobstructed and properly stocked?

____

____

5. PARTS/INVENTORY AREA

MATERIAL HANDLING EQUIPMENT (FORKLIFT IN BREEZEWAY)

Ok Action Needed

G G Are the required lift truck operating rules posted and enforced?

G G Does forklift have a warning horn, whistle which can be clearly heard above the normal noise in the areas where operated?

G G Is the forklift's parking brake set to prevent the vehicle from moving if unattended?

G G Are the forks on the floor when the forklift is not in use?

G G Do forklift operators have current forklift certification?

G G Is daily operating log being kept?

____

____

MISCELLANEOUS

Ok Action Needed

G G Are power trucks, hand trucks, and lifting equipment in good working order?

G G Are ropes, chains, and slings used to handle material and equipment in good working order?

G G All safety devices are in good working order.

G G Is overhead hoist equipped with a pull cover or cord which is in good working order?

____

____

FIRE PROTECTION

Ok Action Needed

G G Fire extinguisher checked for proper mounting, testing dates, size and fullness.

G G Area around fire extinguisher is unobstructed.

G G Flammable materials are properly stored?

G G Are overhead sprinkler systems intact and free of leaks?

G G Fire protection location signs, exits, and warnings are visible and properly located.

G G Sprinkler system area is clean and unobstructed.

____

____

HOUSEKEEPING

Ok Action Needed

G G Aisles, stairs, floors, walkways, and counters are free of clutter, clean and have proper markings for safety.

G G Stair railings are properly mounted, have no broken, cracked or missing parts.

G G Counter tops, cabinet tops, and desks are not used for storage and piling of materials.

G G Area around recycling bin is clean and unobstructed.

____

____

6. SERVICE AREAS (Including lube pits and wheel lifts)

WHEEL LIFT

Ok Action Needed

G G Rear wheel hoist supports are not bent, broken or damaged.

G G Safety jacks and wheel chalks are properly used.

G G There is no hydraulic fluid leaks around the lift and motor areas.

____

____

OIL FILTER CUTTER

Ok Action Needed

G G Guard over blade is operable and in good condition.

G G Personal protective equipment, safety glasses, or face shield and gloves are available.

G G No oil spills on floor around machine.

____

____

PARTS WASHER (North/South)

Ok Action Needed

G G Personal protective equipment (gloves) are available and used by employees.

G G Cleaners are equipped with covers that close.

____

____

HOUSEKEEPING

Y N

G G Aisles, stairs, floors, and walkways are free of clutter, clean and have proper safety markings.

G G Waste is disposed of properly.

G G There is proper ventilation and lighting.

G G Vehicle bays are equipped with efficiently operating exhaust fans.

G G Floor is free of oil and other spills.

____

____

FIRE PROTECTION

Ok Action Needed

G G Fire extinguisher checked for proper mounting, testing dates, size and fullness.

G G Area around fire extinguisher is unobstructed.

G G Are flammable materials, chemicals and other flammables stored in the proper places?

G G Overhead sprinkler systems intact and free of leaks?

G G Fire protection location signs, exits, and warnings are visible and properly placed.

____

____

MISCELLANEOUS

Ok Action Needed

G G All safety chains securing area around lube pits are fastened and in good condition.

G G Electrical cords, outlets and plugs are free from frayed, burnt or bad wiring and connections.

G G Steps, ladders and step stools are free from loose, broken or missing parts.

G G Check Maintenance inspection sheets to ensure safety devices on all overhead doors have been checked or proper operation. (Check with Facility Manager.)

7. BUILDINGS & GROUND

POWER TOOLS

Ok Action
Needed
G G Electrical cords and plugs on tools are free from frayed, burnt or damaged connections.
G G Tools are stored in their proper areas.

____

____

CHASSIS LIFT

Ok Action
Needed
G G Is lifting cable free of frayed or damaged cable wires?
G G Are locks engaging when lift is turned on and operating?

____

____

FIRE PROTECTION

Ok Action
Needed
G G Fire extinguisher checked for proper mounting, testing dates, size and fullness.
G G Area around fire extinguisher is unobstructed.
G G Flammable materials stored in the proper areas?
G G Overhead sprinkler system intact and free of leaks?
G G All fire extinguisher location signs, exits, and warnings are visible and properly displayed.

____

____

CHOP SAW

Ok Action
Needed
G G Machine guard in place and in good condition.

____

____

8" JOINER

Ok Action
Needed
G G Machine guard in place and in good condition.

____

____

TABLE SAW

Ok Action
Needed
G G Machine guard in place and in good condition.

____

____

FIRST AID

Ok Action
Needed
G G Are first aid kits easily accessible to work area, with required supplies available, periodically inspected and replenished as needed?
G G All first aid equipment is clearly displayed and area around display is clean and unobstructed.

____

____

HOUSEKEEPING

Ok Action
Needed

G G All aisles, floors and walkways are clean and unobstructed.

G G Stairs to loft storage has proper railings and are in good working order?

G G Working materials are properly stored and do not obstruct working areas.

G G Work areas have proper lighting and ventilation.

G G Waste is disposed of properly. Area is clean and free of tripping or slipping hazards.

____

____

MISCELLANEOUS

Ok Action
Needed

G G All electrical outlets and plugs are free from frayed, burnt or damaged cords, and there are no broken or missing parts.

G G Counter tops, desks, and tables are free of storage and materials that would result in a safety hazard.

G G Hazardous chemicals and products are properly stored and labeled.

____

____

8. BODY SHOP/PAINTING BOOTH

ELECTRIC HACKSAW

Ok Action
Needed

G G Guards, covers and shields are installed and in good working order.
G G Machine is properly secured by leveling legs.
G G Machine is unobstructed and properly maintained.
G G Proper personal protective equipment (goggles) is available and used by the employees.

ELECTRIC SHEARS

Ok Action
Needed

G G Guards, covers and shields are installed and in good working order.
G G Equipment is bolted to the floor securely.
G G Machine warning signs are easily visible and located on or near the machine.

FIRST AID EQUIPMENT

Ok Action
Needed

G G Are first aid kits easily accessible to work area, with required supplies available, inspected and replenished as needed?
G G If eye wash is present is it in good working order?
G G Do displays for first aid have proper signage, and is area around display unobstructed?

BENCH GRINDER

Ok Action
Needed

G G Guards and shields in place and working properly.
G G Grinder is secured to table properly.

DRILL PRESS

Ok Action
Needed

G G Guards, covers and shields are installed and in good working order.
G G Personal protective equipment (safety goggles) are available and are used by employees.
G G Machine is unobstructed and area around drill press is clean.
G G Drill press on and off switch is working properly.

FIRE PROTECTION

Ok Action
Needed

G G Fire extinguishers checked for proper mounting, testing dates, size and fullness.
G G Area around fire extinguisher is unobstructed.
G G Flammable materials are stored properly?
G G Are overhead sprinkler systems intact and free of leaks?
G G Do overhead sprinklers in paint booth only have sandwich bags placed over heads to prevent paint particles from blocking sprinkler jets.
G G Fire protection location signs, exits, and warnings are easily visible and properly placed.

HOUSEKEEPING

Ok Action Needed

G G Aisles, floors, walkways, and counters are free of clutter, clean and have proper markings for safety.

G G Area has proper ventilation and lighting.

G G Working materials are properly stored and do not obstruct working area.

G G Ladders/step ladders are secure and in safe working order.

G G Wheels, rubber tips, steps, and support braces on ladders and steps are free of hazards.

G G Exhaust fans are in good working order.

G G Paint booth filters are clean and changed when vacuum pressure is lost.

GRINDERS

Ok Action Needed

G G Grinding wheels are in good condition.

G G Personal protective equipment (safety glasses/ shields) readily available and used by employees.

G G Safety guards are close to wheels on both sides.

G G Area around grinder is clean, free of clutter and unobstructed.

MACHINE LATHE

Ok Action Needed

G G All guards, covers and safety devices are installed and in good working order.

G G Personal protective equipment (safety goggles/ shields) readily available and used by employees.

G G Machine is clean, secure and well maintained.

G G There is proper lighting around lathe.

G G Area around lathe is clean and unobstructed.

G G Are machine guards in place and being used while operating the machine?

BANDSAW

Ok Action Needed

G G All guards, covers and safety devices are installed and in good working order.

G G Personal protective equipment (safety goggles/ shields) readily available and used by employees.

G G Bandsaw is clean, secure and well maintained.

G G There is proper lighting around bandsaw.

G G Machines on and off switch is in good working order.

G G Area around bandsaw is clean and free from clutter.

WELDING EQUIPMENT

Ok Action Needed

G G Is a fire extinguisher provided at welding site?

G G Is there proper personal protective clothing and equipment available for use?

9. OUTSIDE STORAGE

MATERIAL HANDLING EQUIPMENT (FORKLIFT (South side under RV cover)

Ok Action Needed

G G Inspection sheet up-to-date.
G G Are the required lift truck operating rules posted and enforced?
G G Does forklift have a warning horn, whistle which can be clearly heard above the normal noise in the areas where operated?
G G Is the forklift's parking brake set to prevent the vehicle from moving if unattended?
G G Are the forks on the floor when the forklift is not in use?
G G Do forklift operators have current forklift certification?
G G Is daily operating log being kept?
G G Inspection sheet up-to-date.

____
____

SCISSOR LIFT

Ok Action Needed

G G All safety labels in place.
G G Check maintenance log (see Facility Manager.)

____
____

10 MACHINING AREA

HYDRAULIC PRESS

Ok Action
Needed

G G Machines on/off switch is in good working order.

G G Area around hydraulic press is clean and free from clutter.

____

____

LARGE PARTS WASHER

Ok Action
Needed

G G All safety devices in place and in good working order.

G G Area around large parts washer is clean, secure and free from clutter.

G G Machine is properly maintained and free of leaks.

G G Personal protective equipment (safety shields, gloves and hard hats if overhead hazards exist) are readily available and used by employees.

G G Machine is free of loose or broken brackets, guards, and parts.

____

____

SMALL PARTS WASHER

Ok Action
Needed

G G Personal protective equipment (gloves) are available and used by employees.

____

____

BATTERY ROOM

Ok Action
Needed

G G Battery room is properly identified, locked, and accessible only to authorized personnel. (Key is in Inventory.)

G G Personal protective equipment (eye protection, gloves, aprons) available and used by employees.

G G Eye wash, full-body shower are clean and unobstructed.

G G Room has proper ventilation and lighting.

G G Floors and walkways are clean and free of clutter.

____

____

STEAM ROOM

Ok Action
Needed

G G Exhaust fan operating and in good working order.

G G Proper ventilation and lighting in the area.

G G Personal protective equipment (safety goggles/ shields/gloves, and aprons) readily available and used by employees.

G G Flammable materials are not in or around area.

G G Room is clean and free of clutter.

____

____

LUBRICATION ROOM

Ok Action
Needed

G G Walkways and aisles are clean and free of clutter.

G G There is proper lighting and ventilation in room.

G G All flammable materials are stored properly.

TRANSMISSION REBUILD ROOM

Ok Action
Needed
G G Waste is disposed of properly and room is clean and free of clutter.
G G Working materials are properly stored and do not obstruct working area.
G G Work area has proper lighting and ventilation.

TRICELERATOR ROOM

Ok Action
Needed
G G Area is clean and free of obstructions.
G G There are no loose wires or connections.
G G All pipes are free of leaks.
G G Floor is free of spills or slipping hazards.
G G Electrical conduits are properly covered.
G G Chemicals are properly stored.

HAND TOOL ROOM

Ok Action
Needed
G G All hand tools are clean and stored properly.
G G Area is clean and free of safety hazards.

11. MAINTENANCE EMPLOYEE LOUNGE

Ok Action Needed

G G Exits, hallways and doorways are clean and free from obstruction.

G G Electrical appliances are away from fire hazards, outlets are not overused, and cords are in good condition.

G G Aisles, floors and walkways are clean and free from clutter.

G G Waste is disposed of properly.

G G There is proper ventilation and lighting.

G G Counter tops, tables, ledges are clean and secure.

G G Washrooms and locker rooms are clean, sanitary and free from clutter.

G G Are evacuation maps displayed.

G G Defibrillator – Is green light flashing?

G G Defibrillator – Are breakaway tags still intact?

____
____

FIRE PROTECTION

Ok Action Needed

G G Fire extinguisher are checked for proper mounting, testing dates, size and fullness.

G G Area around fire extinguisher is unobstructed.

G G Are flammable materials and chemicals are stored in the proper areas?

G G Fire protection signs, exits, and warnings are visible and properly placed.

____
____

FIRST AID

Ok Action Needed

G G Are first aid kits easily accessible to work area with required supplies available, periodically inspected and replenished as needed?

G G Are eye wash displays at or around parts cleaner area?

G G Location signs for eye wash displays properly posted?

G G Eye wash areas are clean and obstructed.

G G Eye wash located by steam room door is clearly marked and in good working order?

____
____

Additional Comments ____________________

12. ADMINISTRATION BUILDING

HOUSEKEEPING

Ok Action Needed

G G Aisles, floors and walkways are clean and free of unnecessary or unsafe clutter.
G G Working materials are properly stored and do not obstruct working areas.
G G Waste is disposed of properly and area around waste receptacles are clean and unobstructed.
G G Work areas have proper ventilation and lighting.
G G Counter tops, tables, ledges are used for their intended purpose.
G G On inspection of rest rooms, they are clean, safe, and comply with the ADA (Americans with Disabilities Act.)
G G Employees lounge areas are clean and free from safety hazards.
G G Defibrillator – Is green light flashing?
G G Defibrillator – Are breakaway tags still intact?

FIRE PROTECTION

Ok Action Needed
G G Fire extinguisher checked for proper mounting, testing dates, size and fullness.
G G Area around fire extinguisher is unobstructed.
G G Building exits are clearly marked and readable?
G G All fire extinguisher location signs, exits, and warnings are visible and properly placed.
G G Overhead sprinklers intact and free of leaks?

MISCELLANEOUS

Ok Action Needed
G G Electrical plug outlets are not being overused, and surge protectors are being used.
G G There is sufficient lighting and ventilation in work areas.
G G All extension cords, plug connectors and adapters are being used correctly.
G G All entrances to the buildings are clean and unobstructed and comply with the ADA (Americans with Disability Act).
G G All furniture is free from broken, bent or missing parts that could cause safety hazards.
G G Carpeting is secure to floor and poses no tripping hazards.

COMPUTER ROOM

Ok Action Needed
G G Fire extinguishing system is being inspected every six months. (check tag)

JANITOR CLOSET IN ADMINISTRATION BUILDING

Ok Action Needed
G G Check inspection tag on fire main, (must be inspected annually.)
G G Is janitor's equipment stored properly and not obstructing fire main shut off valve?

PHONE ROOM

Ok Action Needed

G G Installed fire extinguishing system, must be inspected every six months. (check tag)

13. DEVELOPMENT/I.T.

HOUSEKEEPING

Ok Action Needed

G G All aisles, floors, and walkways are clean and free of unnecessary or unsafe clutter.

G G Working materials are properly stored and do not obstruct working areas.

G G Waste is disposed of properly; areas around waste receptacles are clean and unobstructed.

G G Work areas have proper lighting and ventilation.

G G Counter tops, table tops, and ledges are used for their intended purpose.

G G On inspection of rest rooms, they are clean, safe and comply with the ADA (Americans with Disability Act).

G G Employees break room is clean and free from safety hazards.

____

____

FIRE PROTECTION

Ok Action Needed

G G Fire extinguisher checked for proper mounting, testing dates, size and fullness.

G G Area around fire extinguisher is unobstructed.

G G Sufficient type and size extinguishers for the work areas?

G G Building exits are clearly marked and readable?

G G All flammable materials and chemicals are stored in the proper areas?

G G Overhead sprinklers intact and free of leaks?

____

____

FIRST AID (Break Room)

Ok Action Needed

G G Are first aid kits easily accessible to work area, with required supplies available, periodically inspected and replenished as needed?

G G Do displays for first aid have proper signage? Is area around display clean and unobstructed?

____

____

MISCELLANEOUS

Ok Action Needed

G G Electrical plug outlets are not being overused, and surge protectors are being used.

G G All extension cords, plug connectors and adapters are being used correctly.

G G All entrances to the buildings are clean and unobstructed and comply with the ADA (Americans with Disability Act).

G G All furniture is free from broken, bent or missing parts that could cause safety hazards.

____

____

Additional Comments ____________________

____

____

____

____

____

____

____

____

____

____

____

____

14. ANNEX WAREHOUSE

HOUSEKEEPING

Ok Action
Needed

G G Floors and walkways are free of clutter, clean and have proper markings for safety.

G G Area has proper lighting and ventilation.

G G Area around disposal equipment is clean and free from clutter.

G G Working equipment and cleaning material is properly stored and does not obstruct working area.

G G Area is free of slipping hazards.

G G Equipment and materials stored on overhead shelves are kept in such a manner as to prevent possibility of falling.

FIRE PROTECTION

Ok Action
Needed

G G Fire extinguisher checked for proper mounting, testing dates, size and fullness.

G G Area around fire extinguisher is unobstructed.

G G Sufficient type and size extinguishers for the work areas?

G G Building exits are clearly marked and readable?

G G All fire extinguisher location signs, exits, and warnings are visible and properly placed.

G G All flammable materials and chemicals are stored in the proper areas?

G G Are overhead sprinklers intact and free of leaks?

FIRST AID

Ok Action
Needed

G G Are first aid kits easily accessible to work area, with required supplies available, periodically inspected and replenished as needed?

G G Do displays for first aid have proper signage and is area around display clean and unobstructed?

Additional Comments

15. OPERATIONS CENTER

HOUSEKEEPING

Ok Action Needed

G G All aisles, floors, and walkways are clean and free of unnecessary or unsafe clutter.

G G Working materials are properly stored and do not obstruct working areas.

G G Waste is disposed of properly; areas around waste receptacles are clean and unobstructed.

G G Work areas have proper lighting and ventilation.

G G Counter tops, table tops, and ledges are used for their intended purpose.

G G On inspection of rest rooms, they are clean, safe and comply with the ADA (Americans with Disabilities Act).

G G Employees lounge areas are clean and free from safety hazards.

G G All federal and state required information is properly posted and maintained.

G G Defibrillator – Is green light flashing?

G G Defibrillator – Are breakaway tags still intact?

____

____

FIRE PROTECTION

Ok Action Needed

G G Fire extinguisher checked for proper mounting, testing dates, size and fullness.

G G Area around fire extinguisher is unobstructed.

G G Sufficient type and size extinguishers for the work areas?

G G Building exits are clearly marked and readable?

G G All fire extinguisher location signs, exits, and warnings are visible and properly placed.

G G All flammable materials and chemicals are stored in the proper areas?

G G Overhead sprinklers intact and free of leaks?

____

____

SPRINKLER ROOM IN OPERATIONS BUILDING

Ok Action Needed

G G Check inspection tag on fire main, (must be inspected annually.)

G G Is janitor's equipment stored properly and not obstructing fire main shut off valve?

____

____

FIRST AID

Ok Action Needed

G G Are first aid kits easily accessible to work area, with required supplies available, periodically inspected and replenished as needed?

G G Do displays for first aid have proper signage?

G G Is area around display clean and unobstructed?

____

____

16. VANCOUVER MALL

MISCELLANEOUS

Ok Action Needed

G G Electrical plug outlets are not being overused, and surge protectors are being used.

G G There is sufficient lighting and ventilation in work areas.

G G All extension cords, plug connectors and adapters are being used correctly.

G G All entrances to the buildings are clean and unobstructed and comply with the ADA (Americans with Disabilities Act).

G G All furniture is free from broken, bent or missing parts that could cause safety hazards.

G G Carpeting is secure to floor and poses no tripping hazards.

HOUSEKEEPING

Ok Action Needed

G G All aisles, floors, and walkways are clean and free of unnecessary or unsafe clutter.

G G Working materials are properly stored and do not obstruct working areas.

G G Waste is disposed of properly; areas around waste receptacles are clean and unobstructed.

G G Work areas have proper lighting and ventilation.

G G Counter tops, table tops, and ledges are used for their intended purpose.

G G On inspection of rest rooms, they are clean, safe and comply with the ADA (Americans with Disabilities Act).

G G Employees lounge areas are clean and free from safety hazards.

G G All federal and state required information is properly posted and maintained.

FIRE PROTECTION

Ok Action Needed

G G Fire extinguisher checked for proper mounting, testing dates, size and fullness.

G G Area around fire extinguisher is unobstructed.

G G Sufficient type and size extinguishers for the work areas?

G G Building exits are clearly marked and readable?

G G All fire extinguisher location signs, exits, and warnings are visible and properly placed.

G G All flammable materials and chemicals are stored in the proper areas?

G G Overhead sprinklers intact and free of leaks?

FIRST AID

Ok Action Needed

G G Are first aid kits easily accessible to work area, with required supplies available, periodically inspected and replenished as needed?

G G Do displays for first aid have proper signage?

G G Is area around display clean and unobstructed?

MISCELLANEOUS

Ok Action Needed

G G Electrical plug outlets are not being overused, and surge protectors are being used.

G G There is sufficient lighting and ventilation in work areas.

G G All extension cords, plug connectors and adapters are being used correctly.

G G All entrances to the buildings are clean and unobstructed and comply with the ADA (Americans with Disabilities Act).

G G All furniture is free from broken, bent or missing parts that could cause safety hazards.

G G Carpeting is secure to floor and poses no tripping hazards.

____
____

Additional Comments ____________________

17. 7th STREET BUILDING

HOUSEKEEPING

Ok Action Needed

G G All aisles, floors, and walkways are clean and free of unnecessary or unsafe clutter.

G G Working materials are properly stored and do not obstruct working areas.

G G Waste is disposed of properly; areas around waste receptacles are clean and unobstructed.

G G Work areas have proper lighting and ventilation.

G G Counter tops, table tops, and ledges are used for their intended purpose.

G G On inspection of rest rooms, they are clean, safe and comply with the ADA (Americans with Disabilities Act).

G G Employees lounge areas are clean and free from safety hazards.

G G All federal and state required information is properly posted and maintained.

FIRE PROTECTION

Ok Action Needed

G G Fire extinguisher checked for proper mounting, testing dates, size and fullness.

G G Area around fire extinguisher is unobstructed.

G G Sufficient type and size extinguishers for the work areas?

G G Building exits clearly marked and readable?

G G All fire extinguisher location signs, exits, and warnings are visible and properly placed.

G G All flammable materials and chemicals are stored in the proper areas?

G G Are overhead sprinklers intact and free of leaks?

FIRST AID

Ok Action Needed

G G Are first aid kits easily accessible to work area, with required supplies available, periodically inspected and replenished as needed?

G G Do displays for first aid have proper signage and is area around display clean and unobstructed?

MISCELLANEOUS

Ok Action Needed

G G Electrical plug outlets are not being overused, and surge protectors are being used.

G G There is sufficient lighting and ventilation in work areas.

G G All extension cords, plug connectors and adapters are being used correctly.

G G All entrances to the buildings are clean and unobstructed and comply with the ADA (Americans with Disabilities Act).

G G All furniture is free from broken, bent or missing parts that could cause safety hazards.

G G Carpeting is secure to floor and poses no tripping hazards.

G G Metal sidewalk gratings are checked for wear of anti-skid materials (in front of Coach Operators' lounge, the #30 spot, and in front of the Customer Assistance Office window).

18. FISHER=S LANDING

HOUSEKEEPING

Ok Action Needed

G G All aisles, floors, and walkways are clean and free of unnecessary or unsafe clutter.

G G Working materials are properly stored and do not obstruct working areas.

G G Waste is disposed of properly; areas around waste receptacles are clean and unobstructed.

G G Work areas have proper lighting and ventilation.

G G Counter tops, table tops, and ledges are used for their intended purpose.

G G On inspection of rest rooms, they are clean, safe and comply with the ADA (Americans with Disabilities Act).

G G Employees lounge areas are clean and free from safety hazards.

G G All federal and state required information is properly posted and maintained.

____

____

FIRE PROTECTION

Ok Action Needed

G G Fire extinguisher checked for proper mounting, testing dates, size and fullness.

G G Area around fire extinguisher is unobstructed.

G G Sufficient type and size extinguishers for the work areas?

G G Building exits clearly marked and readable?

G G All fire extinguisher location signs, exits, and warnings are visible and properly placed.

G G Are overhead sprinkler systems intact and free of leaks?

G G All flammable materials and chemicals are stored in the proper areas?

____

____

FIRST AID

Ok Action Needed

G G Are first aid kits easily accessible to work area, with required supplies available, periodically inspected and replenished as needed?

G G Do displays for first aid have proper signage and is area around display clean and unobstructed?

____

____

MISCELLANEOUS

Ok Action Needed

G G Electrical plug outlets are not being overused, and surge protectors are being used.

G G There is sufficient lighting and ventilation in work areas.

G G All extension cords, plug connectors and adapters are being used correctly.

G G All entrances to the buildings are clean and unobstructed and comply with the ADA (Americans with Disabilities Act).

G G All furniture is free from broken, bent or missing parts that could cause safety hazards.

G G Carpeting is secure to floor and poses no tripping hazards.

G G Stairways are clean and unobstructed.
G G Elevator is in proper working order.
G G Parking lots are clean and well maintained.
G G Passenger loading areas are safe and unobstructed.

____
____

19. EVERGREEN TRANSIT CENTER

Ok Action Needed
G G Waste is disposed of properly, areas around waste receptacles are clean and unobstructed.
G G On inspection of rest rooms they are clean, safe, and comply with the Americans with Disabilities Act (ADA).
G G Parking lots are clean and well maintained.
G G Passenger loading areas are safe and unobstructed.

Additional Comments __________________________

20. SALMON CREEK PARK & RIDE

Ok Action Needed
G G Waste is disposed of properly, areas around waste receptacles are clean and unobstructed.
G G On inspection of rest rooms they are clean, safe, and comply with the Americans with Disabilities Act (ADA).
G G Parking lots are clean and well maintained.
G G Passenger loading areas are safe and unobstructed.

Additional Comments __________________________

21. 99th STREET

Ok	Action Needed	
G	G	Waste is disposed of properly, areas around waste receptacles are clean and unobstructed.
G	G	On inspection of rest rooms they are clean, safe, and comply with the Americans with Disabilities Act (ADA).
G	G	Parking lots are clean and well maintained.
G	G	Passenger loading areas are safe and unobstructed.

Additional Comments ______________________
____
____
____
____
____
____
____

22. PARATRANSIT COACH

SAMPLE 1 B
COACH # __________

G First aid kit properly stored and maintained.
G Safety triangle stored properly.
G Bus floor B no torn or loose materials.
G Doors B operating correctly.
G Emergency exits B test to see if windows open.
G Fire extinguisher B properly stored and up-to-date.
G Restraining straps B check for ADA compliance.
G Operation of wheel chair lift (check to see if working properly.)

SAMPLE 2 B
COACH # ____________

G First aid kit properly stored and maintained.
G Safety triangle stored properly.
G Bus floor B no torn or loose materials.
G Doors B operating correctly.
G Emergency Exits B test to see if windows open.
G Fire extinguisher B properly stored and up-to-date.
G Restraining straps B check for ADA compliance.
G Operation of wheel chair lift (check to see if working properly.)

Additional Comments ______________________
____
____
____

23. TRANSIT SERVICES COACH

SAMPLE 1 B
COACH # ____________

G First aid kit properly stored and maintained.
G Safety triangle stored properly.
G Bus floor - no torn or loose materials.
G Doors - operating correctly.
G Emergency exits - test to see if windows open.
G Fire extinguisher - properly stored and up-to-date.
G Restraining straps B check for ADA compliance.
G Operation of wheel chair lift (check to see if working properly.)

SAMPLE 2 B
COACH # _____________

G First aid kit properly stored and maintained.
G Safety triangle stored properly.
G Bus floor- no torn or loose materials.
G Doors - operating correctly.
G Emergency exits - test to see if windows open.
G Fire extinguisher - properly stored and up-to-date.
G Restraining straps B check for ADA compliance.
G Operation of wheel chair lift (check to see if working properly.)

Additional Comments _____________________
____
____
____

VIII- *ON-THE-JOB INJURY FORMS*

EMPLOYEE'S REPORT OF OCCUPATIONAL INJURY OR ILLNESS EXHIBIT 1

INJURED OR ILL EMPLOYEE

Name			Claim Number:
Address			
Home Phone	Age	Sex ☐ Male ☐ Female	Employee #
Department	Occupation		
Shift Hours Start: _____ a.m. p.m. End: _____ a.m. p.m.	Scheduled Days Off		

DESCRIPTION OF ACCIDENT OR EXPOSURE TO OCCUPATIONAL ILLNESS

Date of Incident: _____ Time _____ a.m. / p.m.	Date Reported to Supervisor/Dispatcher ___________ Time _____ a.m. / p.m.
Name and Title to Whom Reported:	
Address or Location Where Incident Occurred:	
Was place of accident or exposure on employer's premises? Yes ☐ No ☐	
What were you doing when incident occurred?	
Did anyone witness the incident? Yes ☐ No ☐	
If yes, name of witness	Telephone No.
Describe the events that caused this incident. Tell what happened and how it happened. Name any objects or substances involved, and describe how they were involved. Give full details of all factors that led or contributed to the incident. Use bottom of second page or a separate piece of paper if more space is needed.	
Equipment No.	
Were you doing your regular job at the time of the incident? Yes ☐ No ☐	
Was incident caused by failure of a machine or product? Yes ☐ No ☐	
Below, describe the injury or illness in detail and indicate the part of body affected.	
Name the object or substance that directly injured the employee. (Example: The machine or thing you struck against, or which struck you; the vapor or poison inhaled or swallowed; the object you were lifting or pulling; etc.)	
Severity of Injury: Lost work days – days away from work _________ Lost workdays – days of restricted work _____ ☐ Medical Treatment: ☐ First Aid ☐ Other, specify _____ If time loss occurred, last day worked: _____	

If medical treatment was received, name physician:	Date first treated	Indicate location treated: ☐ Doctor's office ☐ Kaiser Permanente clinic ☐ SWWMC Emergency room ☐ Other (please indicate) _____

Have you ever before been treated for a similar injury or illness? Yes ☐ No ☐	
If yes, when did it occur?	How did it happen?
Are you currently working for another employer in addition to C-TRAN? Yes ☐ No ☐	If yes, what is your occupation? _____ Dates of employment _____

THIRD PARTY

In your opinion, was accident caused by someone not employed by C-TRAN? Yes ☐ No ☐	
If incident was caused by someone not employed by C-TRAN, please complete the following: Name of responsible party Address:	
Home Telephone # _____ Work Telephone # _____	Drivers License No.: _____ State: _____ Vehicle License No.: _____ State: _____
Insurance Company: _________ Agent: _____ Agent Telephone #: _____	

I certify that this is a true account of my occupational injury/illness and recognize that any benefits which are fraudulently obtained, may subject me to criminal prosecution.

Employee's Signature: ____ Date: ____

Supervisor's Signature: ____ Date Report Received: ________________________________

DESCRIPTION OF EVENTS THAT CAUSED THIS INCIDENT (Continued)

In addition to this form, please complete (1) Incident/Accident Report; (2) Election to Supplement Time Loss (Transit Services and Paratransit Services Employees Only)

SUPERVISOR'S REPORT OF OCCUPATIONAL INJURY, ILLNESS, or ACCIDENT EXHIBIT 2

☐ Accident ☐ Illness Report Date:______________________________

Injured or Ill Employee Name: ______________________________ Employee No. ____________

Job Title: ______________________________ Dept.____________

ACCIDENT INVESTIGATION

Date of Accident/Illness: ____________________ Time of Accident or Illness:_____ a.m./p.m.

Phase of employee's work day (entering/leaving work, lunch periods, performing work duties, working overtime, other): ____________

____

Accident Location: ______________________________ Bus Number: ____________

Eyewitness(es) (List name, address, and phone; interview and attach interview form):

1. ____

2. ____

Describe in sequence how accident occurred or situation contributed to illness. Include any machine, object, or substance involved. Attach facts, photos, and diagrams to explain in full what happened:

____

____

____

____

____

Was a VCR written, if needed? ☐ Yes ☐ No. By Whom? ______________________________

Did you have employee demonstrate how he/she was injured? ☐ Yes ☐ No Please indicate below what you observed:

____

____

Did you visit the accident site (if applicable)? ☐ Yes ☐ No Please indicate below what you observed:

____

____

If no specific incident was reported by the employee, how does employee know incident occurred on the job?

____

____

Do you believe the injury occurred as described? ☐ Yes ☐ No Explain: ______________________________

____

____

NATURE OF INJURY/ILLNESS

INJURED PART(S) OF BODY (indicate right, left, upper, lower, etc.)

☐ Strain or Sprain	☐ Back	☐ Foreign Body in Eye	☐ Eye	☐ Finger	☐ Foot
☐ Laceration	☐ Fracture	☐ Internal	☐ Trunk	☐ Leg	☐ Toe
☐ Contusion	☐ Burn	☐ Head	☐ Hand	☐ Arm	☐ Other (explain)

Nature of job-related illness (explain; be specific):______________________________

____

Has employee complained of previous injury or problems with that area of the body? ☐ Yes ☐ No

Describe the complaint and when it was reported: ____________________

____

____

FIRST AID TREATMENT

Was first aid treatment given? ☐ Yes ☐ No (if no, when will employee visit a doctor?) (give date) ____________

(if yes, provide name and address of person administering treatment): ____________________

____

In your opinion, was the accident caused in any way by someone not employed by C-TRAN? ☐ Yes ☐ No

If yes, provide the complete name, address, telephone number, and name of employer of the person involved: ____________

____

CAUSE OF ACCIDENT-UNSAFE CONDITIONS

Indicate base cause	Indicate contributing cause
1 ☐ Unguarded or inadequately guarded	1 ☐ Operating without authority
2 ☐ Defective tools, equipment, or substance	2 ☐ Operating at unsafe speed
3 ☐ Unsafe design or construction	3 ☐ Making safety devices inoperative
4 ☐ Hazardous arrangement	4 ☐ Using unsafe equipment
5 ☐ Unsafe illumination	5 ☐ Loading, placing, mixing unsafely
6 ☐ Unsafe clothing	6 ☐ Working on moving or dangerous equipment
7 ☐ Insufficient instruction	7 ☐ Distracting, teasing, horseplaying
8 ☐ Failure to use personal protective device	8 ☐ Taking unsafe position
9 ☐ Other ____________	9 ☐ Other ____________

Why was the unsafe act committed by the employee? ____________________

____

Why did the unsafe condition exist? ____________________

CORRECTIVE ACTION (Based on the cause indicated above, I am taking the following corrective action):

UNSAFE ACT	UNSAFE CONDITION	RECOMMENDATION (if Supervisor cannot handle)
1 ☐ Stop the worker	1 ☐ Remove	1 ☐ Refer to own boss
2 ☐ Study the job	2 ☐ Guard	2 ☐ Refer to Safety Committee, or
3 ☐ Instruct (tell, show, try, check)	3 ☐ Warn	3 ☐ Refer to Maintenance Dept., or
4 ☐ Follow up	4 ☐ Supervisory training	4 ☐ ____________
5 ☐ Enforce policy		5 ☐ Follow up

What I am doing to prevent similar injuries or illnesses: ____________________

____

____

Additional recommendations: ____________________

____

____

____________________ ____________________

Investigating Supervisor Department Director

EYEWITNESS INTERVIEW FOR OCCUPATIONAL INJURY OR ILLNESS

DATE INTERVIEWED:_____

NAME OF WITNESS:

INDICATE ONE: ☐ **TELEPHONE** ☐ **IN PERSON**

ADDRESS:

TELEPHONE NUMBER:

WHERE WAS EYEWITNESS WHEN HE/SHE SAW THE ACCIDENT OR ILLNESS?

Record witness' description of the accident as he/she saw it occur. Include a description of the surroundings, the position of the injured/ill party relative to the surroundings, the sequence of events observed, and the part of the body that appeared to be injured:

ATTACH THIS FORM TO COMPLETED SUPERVISOR'S REPORT OF OCCUPATIONAL INJURY OR ILLNESS

Investigating Supervisor Date

EXHIBIT 3

EMPLOYEE REPORT FORM

NAME: ____

DATE: ____

REPORTED TO: ____

DESCRIBE YOUR PRESENT CONDITION: ____

____

____

____

____

DOCTOR'S NAME: ____

DOCTOR'S ADDRESS AND PHONE NUMBER: ____

LAST DOCTOR'S APPOINTMENT: ____

NEXT DOCTOR'S APPOINTMENT: ____

PHYSICAL THERAPIST NAME: ____

PHYSICAL THERAPIST ADDRESS AND PHONE NUMBER: ____

DOCTOR'S/PHYSICAL THERAPIST COMMENTS ABOUT YOUR CONDITION THE LAST TIME YOU SAW HIM/HER:

____

____

____

____

EXPECTED DATE TO RETURN TO WORK: ____

EMPLOYEE'S SIGNATURE: ____

SUPERVISOR'S SIGNATURE: ____

G:\SHARED\HR Information\Forms\Human Resources\EMPLOYEE REPORT FORM.doc 5/07

AUTHORIZATION FOR RELEASE OF MEDICAL INFORMATION

I hereby authorize C-TRAN's physicians and/or consulting physicians to disclose to C-TRAN any medical records or other information based upon their examination regarding my fitness to perform my assigned duties.

______________________________ ______________________
Signed Date

______________________________ ______________________
Witness Date

G:\SHARED\HR Information\Forms\Human Resources\AUTHORIZATION FOR RELEASE OF MEDICAL INFORMATION.doc

Addendum B – Maintenance Forms

This page left blank intentionally.

Addendum B Maintenance Forms & Procedures

I- FUELING PROCEDURES
II- CLEANING PROCEDURES
III- GILLIG AND OPTIMA PREVENTATIVE MAINTENANCE CHECKLIST

I- *Fueling Procedures for Vehicle Service Workers*

VSW Fixed Route and Demand Response Duties

The following list should be done on EVERY vehicle pulled into the fuel bay including both Fixed Route and Demand Response buses. The list doesn't have to be done in this order, but every item WILL be covered on every vehicle.

1. Pull bus into fuel bay.
2. Check and service antifreeze, transmission fluid, and engine oil.
   a) Do not service OPUS buses because they use synthetic oil. Instead, notify Maintenance for service.
   b) Do not service transmission fluid on 2006 Ford Eldorado C-VANS (#2112-#2118) or 2006 Ford pickups (#184 and #185). Instead, notify Maintenance for service.
3. Check and refill windshield washing fluid.
   a) Swing shift (Thursday evening)
   b) Day shift (Friday)
   c) Daily during inclement weather
4. Start filling with diesel fuel.
5. Pre-wash ALL tires and rims.
6. Pre-wash back of bus.
7. Pre-wash windshield.
8. Empty fare box.
9. Sweep out entire vehicle up to the front of the bus and vacuum up debris.
10. Vacuum around driver's seat.
11. Vacuum stairs.
    (Sweep all debris to the front of the bus, then vacuum all debris up when the driver's area is vacuumed. Also, vacuum the steps at the same time. All debris must be vacuumed up — not swept out onto the floor. It takes too long to clean the floor, plus the drains get plugged from all the trash blowing around and getting trapped in the drains.)
12. Wipe down dash with damp cloth.
13. Mop floor.
14. Remove gas nozzle and secure bus cap and door.
15. Annotate any required paperwork.
16. Take through bus wash.
17. ENSURE it is clean. (If not, run it through again.)
18. Put mirrors back into adjustment.
    (If mirrors are loose or decals are peeling, ensure Maintenance is notified with a list at the end of the shift. We also had steps installed at the bus wash exit to enable VSWs to reach the hard-to-reach mirrors on the Opus buses).
19. Park vehicle back in lot.

VSW Additional duties will be assigned to the following shifts as follows:

(Dayshift)

Open fuel bay to include unlocking vault and taking meter readings.

Service daily commuter buses and all buses that are parked on south side facing south before end of shift.

Realign buses from south to north lot at end of shift.

Ensure oil service hose collection barrels are emptied when needed.

Empty trash bins from shop with fork lift on Monday and Thursday.

Schedule <u>ALL</u> major cleans to be conducted for all shifts on Friday.

Order all cleaning supplies needed for all shifts once a week.

Major clean coaches and oversee supported employees' work.

The fuel bay will be rinsed out daily at the end of the shift when servicing is complete.

Complete yard sheet and turn into Dispatch by 12 p.m. Update Dispatch periodically as coaches get serviced and moved to the north side.

On Fridays, clean bus wash filter.

(Swing Shift/Graveyard Shift)

Staff vehicles will be looked at daily, and serviced as needed. They will be washed, cleaned, and vacuumed out once a week.

The fuel bay will be rinsed out daily at the end of the shift when servicing is complete and power washed once a week, preferably on Wednesday Night/Thursday Morning.

Pull buses daily. On weekend, ensure that major clean buses for Monday are pulled on Saturday.

Pull PM buses daily. On Friday and Saturday night, be sure to review the status board to see when Sunday PM buses are to be pulled.

Empty fuel bay trash Monday night for a Tuesday morning pick up and Thursday night for a Friday morning pick up.

Major clean coaches and C-VANS and oversee supported employees' work.

Check and service roll-over soap as needed daily.

Conduct pretrip duties.

Empty and clean oil drain barrel once a week, preferably Tuesday – Thursday.

Complete yard sheet and turn into Dispatch by 3 a.m.

Close down fuel bay to include locking vault and taking meter readings.

OUT OF SERVICE NOTIFICATION

VEHICLE # ___________
THIS VEHICLE WILL BE
OUT OF SERVICE
FOR MAINTENANCE

FROM _______________

TO __________________

____
MAINTENANCE SUPERVISOR

II- *Cleaning Procedures for Vehicle Service Workers*

MAJOR CLEANING

VEHICLE # ________________________ **DATE** _________________

MILEAGE ___________________ **LAST BUFF AND WAX** ____________

Please initial areas where cleaned

* Indicates Checks to Perform on "Special Clean"

______ Major cleaning includes the following areas:

______ Empty all trash – floors, under seats, ashtrays, glove box, and trunk

______ Pick up all non-company articles and turn into Lost and Found

______ Shampoo all carpets, upholstery, and side panels if applicable

______ Clean dash, doors, seat sides, and panels; wipe all applicable parts down with dressing

______ Clean all front, side, and rear interior windows, mirrors, and lights

______ De-spot all front, side, and rear exterior windows, mirrors, and bumpers where applicable.

______ Vacuum interior carpets, front and rear

______ Install new trash bag in vehicle

______ Ensure steering wheel is clean

______ Wash exterior of vehicle

______ Buff and wax every six months

______ Dress all tires, bumpers, and exterior panels where applicable

______ Perform visual inspection on interior and exterior of vehicle; note defects

______ Check and ill oil, water, transmission levels

*______ Check and fill windshield washer fluid

*______ Check fuel level and fill if needed

*______ Perform pre-trip inspection to vehicle (done by mechanic)

Comments/Defects: ____

____

____

____

____
Employee Signature

____
Supervisor Signature Date

____
Defect Work Order Date

PRE-TRIP AND SPECIAL INSPECTION SHEET

VEHICLE ______________________

DATE _________________________

	OK	NEEDS ATTENTION
1. Major clean vehicle inside and out		
2. Shampoo seats		
3. De-spot windshield and mirrors		
4. Clean or paint wheels		
5. Tire condition and pressure		
6. Exterior body condition (dents)		
7. Mirrors tight (spot mirrors)		
8. PA systems		
9. Radio check		
10. Brake condition		
11. Heating system		
12. AC system		
13. AC duct temperature		
14. Lights and accessories		
15. Road test		

Comments: ____

____

____

____

___________________________ ____________
Mechanic Signature Date

___________________________ ____________
Supervisor Signature Date

III- *GILLIG AND OPTIMA PREVENTATIVE MAINTENANCE CHECKLIST*

C-TRAN PREVENTATIVE MAINTENANCE
FIXED ROUTE VEHICLE INSPECTION

Date:___________ Vehicle #:___________ Mileage:___________ Interval:______ Inspector:___________
TYPE OF OPERATIONS TO BE PERFORMED: '/ if Okay; 'X' if Adjusted; 'O' if Repairs are Required
PM WORK ORDER NUMBER:___________________________ REPAIR WORK ORDER NUMBER_______________________

	OPERATIONAL CONTROLS		SURVEILLANCE SYSTEM
	Verify that starter will only work in Neutral		Check operation, adjustment, and damage on cameras
	Check operations of wipers and washers		Inspect recorder securement, mounts, wiring, damage
	Inspect all gauges for proper operation		
	Attempt to move bus with Park Brake applied		EXTERIOR
	Check door control operation in all positions		Inspect reflectors for securement, damage, & wear
	Check throttle interlock with exit door activated		Inspect panels and skirts for secure., damage, & wear
	Check brake interlock with exit door activated		Steam clean engine and batteries
	Check throttle interlock with kneeler activated		Gently steam clean radiator core (no caustic cleaners)
	Check brake interlock with kneeler activated		
	Check operation of door dump valve		TIRES AND WHEELS
	Trip door sens edge; should set alarm and open door		Inspect wheel hardware for loose lugs
	Check climate control and reheat mode		Inspect tires for damage
	Check climate control potentiometer		Check hubodometer for securement and damage
	Check blower operation on all speeds		Check for missing valve caps and damaged stems
	Verify proper blower air flow at Driver area ducting		Inspect wheels for damage, cracks, and rust trails
	Operate kneeler. Check alarm and warning lights		Check oil level in front hub oil reservoir
	Check fast idle. (switch must be off to move G-90)		
	Check all exterior lights for proper operation		BATTERIES
	Check all interior lights. Lamps must cancel in Reverse		Remove corrosion and check for proper connections
	Check operation of step well lights		Check cables and terminals for fraying and routing
	Check operation of hazard lights and audible devices		Fill cells on non maintenance-free batteries
	Check operation of signal lights and audible devices		Check battery hold downs for securement and cond.
	Verify Low Air alarm and light activate @ 68-74 PSI		Check charge rate (27.8-28.2 VDC w/fast idle on)
	Check operation of mirrors, heat, and dash indicators		Apply lube to battery tray slides
	Check air buildup: 90-120 within 5 min w/fast idle on		Check alignment of battery compartment door
	Check operation of horn		Inspect battery compartment door seals
	Check operation of all indicator lamps		
	Check B/U lamps and warning alarm in Reverse		UNDERCARRIAGE
	Test Destination Sign for proper operation		Check front end alignment
	Check operation of P/A, mic, amp, and foot switch		Inspect suspension components for damage and wear
	Inspect driver's seatback, bottom, lumbar, and mounts		Check for proper ride height
	Inspect operation of driver's seatbelt		Inspect drag link and ends for damage and wear
	Inspect the tilt/telescopic function of the column		Inspect tie rods for damage, wear, and securement
	Test emergency alarm/destination sign activation		Inspect steering arms for damage and securement
			Check kingpins for excessive movement
	INTERIOR		Inspect swaybar for damage, loose/worn components
	Inspect interior for damage, wear, and grafitti		Inspect air lines for chaffing, proper clamps/routing
	Inspect flooring for damage and wear		Inspect steering gear for leaks, securement, & damage
	Inspect glass for damage or grafitti		Inspect steering lines for leaks, damage, and routing
	Check operation and condition of visors and shades		Inspect power steering pump operation and condition
	Inspect step treads for damage and wear		Inspect steering column condition and operation
	Check rails and stanchions for damage/securement		Inspect steering column u-joints for wear
	Inspect w/c belts for operation and securement		Soap test air bags and inspect for leaks and condition
	Verify there are two spare belts per vehicle		Inspect brake application valve for leaks and condition
	Inspect emergency exits for operation and decals		Inspect brake chambers for leaks and condition
	Lubricate driver's seat and check adjusters		Record lining depth. Inspect for looseness or damage
	Inspect Accident/Vomit Kit for proper inventory		Inspect fuel tank straps for condition or damage
	Check operation of window latches and slides		Inspect fuel lines for chaffing, clamps, and leaks
	Check passenger seats for damage and grafitti		Inspect fuel cap for leaks and securement
	Check chime system, dash indicator, & ADA chime		Inspect frame for cracks and damage
	Inspect fire extinguisher charge, mount, & safety seal		Verify air governor cut-out @ 120#
	Inspect First-Aid Kit for proper inventory		Inspect air brake lines for chaffing, clamps, and leaks
	Check triangle kit for damaged components		Drain air tanks. Inspect for moisture and oil
	Check air intake filters and grills; replace as needed		Inspect relay valves for leaks and damage
			Check operation and condition of moisture ejector
	ELECTRONIC DIAGNOSTICS		Inspect slack adjusters. Maximum stroke: 1.5-2.0"
	Affix code reading device, record codes on form		Inspect pinion seal for leaks
	Clear codes		Inspect for missing grease zerks

	UNDERCARRIAGE (cont)		RADIATOR
	Inspect axle gaskets for leaks		Inspect for leaks, dirt, and debris
	Inspect carrier to housing gasket for leaks		Inspect mounts and louvers for damage
	Inspect radius rods for wear, damage, and securement		Inspect all skirts and panels for damage
	Inspect lateral rod for wear, damage, and securement		Check surge tank, fill cap, and pressure cap
	Inspect shocks and bushings for wear and damage		
	Inspect axle and pinion nuts for securement		TRANSMISSION
	Inspect axle housing mounts for cracks and damage		Inspect case for leaks, damage, and securement
	Inspect suspension mounts for cracks and damage		Inspect mounts for wear and damage
	Inspect propeller shaft for wear and damage		Inspect lines for wear, leaks, and damage
	Check u-joints for lock wire and tightness		Inspect transmission cooler for fluid leaks
	Inspect leveling valves for adjustment and leaks		Inspect retarder housing for leaks and securement
	LUBRICATION		BIKE RACK AND BIKE RACK AD SIGN
	Lube all pivot points on bike rack		Inspect rack for damage and function
	Lube exit door pins		Inspect latch for operation and damage
	Lube windshield wiper pivot joints		Inspect brush guard
	Lube throttle pivots (RTS)		Check condition of paint
	Lube upper rollers on entrance and exit doors		Check securement of ad sign on bike rack
	Lube steering tie-rod ends (2 zerks)		
	Lube drag link ends (2 zerks)		VERICOM BRAKE TEST
	Lube kingpins (4 zerks) (raise axle to relieve pressure)		Test #1:
	Lube driveline u-joints (2 zerks)		Test #2:
	Lube driveline slip spline (1 zerk)		Test #3:
	Lube steering column u-joints (4 zerks)		
	Lube engine door pivots		MOTOR GUARD SYSTEM
	Lube s-cam tubes (1 zerk per wheel position)		Test coolant probe per manual
	Lube slack adjusters (1 zerk per wheel position)		Test 'Hot Engine' shutdown per manual
	Check oil level in differential. Change if contaminated		Test fire alarm per manual
	Drain engine oil		Test 'Low Oil' shutdown per manual
	Replace engine oil filters		
	Install and tighten engine oil drain plug		BATTERY LOAD TEST RESULTS (minimum 9.6 VDC)
	Refill engine with 15/40 oil (40 wt on 2-cycle engines)		Battery #1: VDC
			Battery #2: VDC
	ENGINE COMPARTMENT		Battery #3: VDC
	Inspect belts and automatic tensioners		Battery #4: VDC
	Inspect engine for leaks and abnormal noises		
	Inspect hydraulic tank for proper level and leaks		WHEELCHAIR LIFT (except RTS)
	Inspect transmission fluid level. Adjust as needed		Cycle lift and check for proper operation
	Test antifreeze strength		Test sensitive edges and mats
	Check coolant level in tank. Adjust as needed		Remove access panels and guards
	Inspect air induction system for leaks and securement		Inspect entire structure for cracks and damage
	Inspect air restriction indicator for flag or damage		Check for hydraulic leaks and chaffing hoses
	Inspect engine mounts for wear and securement		Inspect electrical components for chaffing or damage
	Inspect air compressor for air, oil, and coolant leaks		Inspect condition and adjustment of drive chains
	Inspect air lines for leaks, chaffing, and clamps		Apply lubrication to all pivots and chains
	Inspect charge air cooler for wear, damage, or leaks		Reinstall guards and pans
	Drain water from fuel/water seperator		Inspect hydraulic pump unit for leaks and connections
	Inspect hydraulic system for leaks		Check oil level in hydraulic unit. Adjust as needed
	Inspect electrical wiring for chaffing and clamps		Recycle lift to ensure proper operation
	Check operation of engine compartment lights		
	Inspect gauges and switches in rear-run control box		VENTILATION SYSTEM
	Drain air box cannister (2-cycle only)		Inspect ventilation filter. Replace as needed
	PERFORMANCE TEST		RECORD TREAD DEPTH AND PRESSURE
	Check acceleration response		Tire position Tread depth PSI
	Record shift points:		RF:
	1st to 2nd: MPH		LF:
	2nd to 3rd: MPH		RRO:
	3rd to 4th: MPH		RRI:
	4th to 5th: MPH		LRO:
	Governed highway speed: MPH		LRI:
	Check turning radius		
	Check speedometer operation		% BRAKE LINING: FRONT: % REAR: %
	Check odometer operation		

ADDITIONAL TASKS TO BE PERFORMED PER INSPECTION			
	ADDITIONAL TASKS FOR B, D ,F, & H LEVEL INSPECTION		ADDITIONAL TASKS FOR H LEVEL INSPECTION ONLY
	Replace transmission filter		Take engine oil sample
	Replace coolant filter		Take transmission oil sample
	Replace fuel filters		Take differential oil sample
	Apply lube to all window slides and latches		Drain differential; install and torque plug; refill
	Rotate batteries from front to rear (RTS)		
	Replace air filter (RTS)		ADDITIONAL TASKS FOR RTS FLEET ONLY
			Inspect bell crank for wear, securement, and cracks
	ADDITIONAL TASKS FOR D & H LEVEL INSPECTIONS		Inspect upper control arms for wear and securement
	Drain transmission; install and torque plug; refill		Inspect lower control arms for wear and securement
	Lubricate evaporator fanshaft bearings w/EP-2		Inspect stabilizer bar for wear and damage
	Replace hydraulic oil filter		Inspect condition and operation of engine stop cyl.
	Replace air filter (Gillig)		Inspect condition and operation of air throttle comp.
			Inspect condition and operation of fast idle cylinder
	RECORD MILES ON OIL:		
DRIVER'S SEAT			
	Inspect foam cushions for breakdown		Inspect seat tilt adjustments for proper operation
	Inspect seat fabric for tears or other damage		Inspect seat base for cracks or damage
	Inspect condition of all pivot joints and bushings		Ensure seat is level and mounted true to column
	Inspect air line for damage, pinching, or obstruction		Inspect air dump valve for proper operation
	Check operation of slide release and lock mechanism		Inspect height/weight adjustment mechanism
	Inspect condition of three point harness		Ensure full fore and aft movement on tracks
DEFECTS IDENTIFIED DURING INSPECTION			
SIGNATURE OF INSPECTOR:		SIGNATURE OF SUPERVISOR:	
DATE INSPECTION COMPLETED:		DATE REPAIR ORDER POSTED:	

C-TRAN PREVENTATIVE MAINTENANCE

OPTIMA OPUS PM CHECKLIST

Date:____________ Vehicle Number:____________ Inspection Interval:____________ Inspector's Employee Number:____________
Workorder Number:____________ Hubo Reading:____________ Repair Workorder Number:____________ Repaired by:____________
Operation Performed: '/' if Okay; 'X' if Adjusted; 'O' if Further Attention Needed

A' AND 'G' LEVEL INSPECTION (EVERY 6000 MILES)			
ENGINE SERVICE		FRONT AND REAR SUSPENSION	
	Drain engine oil, refill with new oil		Check front hub oil for contamination and proper level
	Replace engine oil filter		Inspect shock absorbers for leakage, damage, or loose bushings
	Check engine mounts and fastener torque		
	Check mounts and hardware on lift pump and injection pump	BRAKES, HUBS, WHEELS, AND TIRES	
	Check mounts and hardware on air compressor		Check automatic brake adjuster operation
	Check crankcase breather tube for obstruction and damage		Inspect brake linings and record depth
			Front brakes:__________% Rear brakes:__________%
COOLING SYSTEM			
	Inspect cooling fan motors for leakage, loose mounts and damage	REAR AXLE AND DRIVELINE	
			Check rear differential gear oil for contamination and proper level
FUEL, AIR, THROTTLE, AND EXHAUST SYSTEMS			Lubricate drive shaft U-joints
	Inspect air filter cannister, hoses, and clamps		Lubricate drive shaft slip joints
	Inspect air filter restriction gauge		Inspect drive shaft and U-joints
	Inspect charge air cooler, piping, and clamps		
	Drain any water from fuel tank	BODY, DOORS, AND UNDERCARRIAGE	
			Test door operation
HVAC SYSTEM			Inspect wheelchair ramp for loose fasteners
	Visually inspect A/C hoses and tubing		Check operation of wheelchair ramp
	Visually inspect for leaks of refrigerant and oil		Inspect wheelchair tie-downs
	Check refrigerant charge and moisture content		
	Check ball floating in top receiver tank sight glass	AIR SYSTEM	
	Clean condensor, evaporator, and change filter		Check brake and throttle interlock system
	Check operation of condensor and evaporator fans		Inspect air lines and fittings
	Check A/C compressor, clutch, and belts		
	Check A/C thermostat calibration	SAFETY EQUIPMENT AND ROAD TEST	
	Check coolant control valve operation		Inspect all exterior lighting for proper operation
	Check marine pump for leaks and proper operation		Inspect all interior lighting for proper operation
	Check operation of defroster		Record any abnormal conditions from road test
	Check operation of windshield de-icer (light will be on five minutes)		Vericom Readings:__________
	Ensure condensate drains are clear and draining		Verify triangles, headsign, and first-aid kit are in proper order
	Check system for Trouble Codes		Inspect horn, b/u alarm, passenger call, and p/a system

B' LEVEL INSPECTION (EVERY 12,OOO MILES) (PERFORM BOTH 'A' AND 'B')			
COOLING SYSTEM		STEERING SYSTEM	
	Inspect cooling fan motor controls		Inspect steering drive shaft U-joints
	Inspect radiator mounts		Inspect steering column shaft U-joints
	Inspect hoses and clamps		Inspect steering boxes
	Check antifreeze concentration		Inspect instrument panel adjuster
			Lubricate steering drag link ball sockets
FUEL, AIR, THROTTLE, AND EXHAUST SYSTEMS			Lubricate steering bix pitman arm bearing
	Inspect exhaust system		Inspect and torque steering fasteners
	Check fast idle operation and RPM		Inspect hydraulic hoses and fittings
	Lubricate accelerator pivot		
		FRONT AND REAR SUSPENSION	
BRAKES, HUBS, WHEELS, AND TIRES			Inspect air bags for condition, leaks, and onstruction
	Inspect wheel condition and ensure lugs are torqued properly		
	Inspect tires for abnormal wear and tread depth	REAR AXLE AND DRIVE LINE	
			Inspect and tighten drive shaft flange bolts
BODY, DOORS, AND UNDERCARRIAGE			
	Test door interlock system	AIR SYSTEM	
	Test emergency door releases		Test air system components for leaks
	Test emergency window and hatch exits		Clean filter at pressure protection valve
	Inspect all seats and tighten fasteners		Clean , test, and inspect brake treadle valve
	Inspect and tighten all stanchions and hand rails		Check operation of air compressor
	Inspect all fasteners and linkages at entrance and exit doors		Clean or replace filters in governor
	Lubricate and inspect all door linkages		Test governor operation
	Steam clean engine and undercarriage		Drain air tanks to expel moisture and contamination
	Check operation of kneeling system, warning light and alarm		
	Inspect w/c ramp wiring and non-slip surfaces		

C' LEVEL INSPECTION (EVERY 18,000 MILES) (PERFORM BOTH 'A' AND 'C')			
FUEL SYSTEM			
	Replace fuel filter		

D' LEVEL INSPECTION (EVERY 24,000 MILES) (PERFORM 'A', 'B', AND 'D')			
ENGINE SERVICE		TRANSMISSION SERVICE	
	Inspect drive belt condition		Replace external transmission oil filter
			Replace internal transmission oil filters
STEERING SYSTEM			Inspect transmission mount condition and fasteners
	Drain and refill hydraulic reservoir		Run performance test on transmission and check Fault Codes
	Check front end alignment		Run performance test on retarder
			Inspect all transmission oil and cooler lines for damage or wear
FRONT AND REAR SUSPENSION			
	Check ride height	AIR SYSTEM	
			Inspect air tanks and tighten fasteners and fittings
BODY, DOORS, AND UNDERCARRIAGE			Test air tank check valves
	Lubricate wheelchair ramp		Test air drier operation

E' LEVEL INSPECTION (EVERY 30,000 MILES) (PERFORM BOTH 'A' AND 'E')			
ENGINE SERVICE		COOLING SYSTEM	
	Inspect fan hub		Replace coolant filter
	Inspect belt tensioner		

F' LEVEL INSPECTION (EVERY 36,000 MILES) (PERFORM+A130 'A', 'B', AND 'F')			
STEERING SYSTEM			
	Lubricate steering tie-rod ball sockets		

H' LEVEL INSPECTION (EVERY 48,000 MILES) (PERFORM 'A', 'B', 'D', AND 'H')			
ENGINE SERVICE		STEERING SYSTEM	
	Inspect engine vibration dampener		Lubricate steering knuckles
FUEL, AIR, AND EXHAUST SYSTEM		BRAKES, HUBS, WHEELS, AND TIRES	
	Air in fuel test		Lubricate automatic slack adjusters
	Vent fuel supply lines test		Lubricate brake shoe anchor pins
			Lubricate brake s-cam shafts
ELECTRICAL			
	Inspect all electrical cables for abrasion or damage	HVAC	
			Perform A/C PM
CHASSIS			Check Evaporator Pressure Regulator (EPR)
	Inspect entire chassis for presence of rust or corrosion		

ITEMS NEEDING REPAIR OR ADJUSTMENT			

Date Posted:_________________________ Supervisor:_________________________

OPUS 29' VEHICLES

Vehicle #	Last H Service	6,000 A	12,000 B	18,000 C	24,000 D	30,000 E	36,000 F	42,000 G	48,000 H
2252	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2253	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2254	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2255	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2256	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2257	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2258	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2259	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2260	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /

OPUS 29' VEHICLES

Vehicle #	Last H Service	6,000 A	12,000 B	18,000 C	24,000 D	30,000 E	36,000 F	42,000 G	48,000 H
2261	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /

GILLIG 35' VEHICLES

Vehicle #	Last H Service	6,000 A	12,000 B	18,000 C	24,000 D	30,000 E	36,000 F	42,000 G	48,000 H
	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /

GILLIG 40' VEHICLES

Vehicle #	Last H Service	6,000 A	12,000 B	18,000 C	24,000 D	30,000 E	36,000 F	42,000 G	48,000 H
2083	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2084	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2087	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2088	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2089	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2090	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2091	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2092	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2093	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /

C-TRAN PREVENTATIVE MAINTENANCE

DEMAND RESPONSE VEHICLE INSPECTION CHECKLIST

Date:____________ Vehicle Number:_______ Mileage:____________ Insp. Interval:___ Empl #:________

Type of Operation to be Performed: '/' if Okay; 'X' if Adjusted; 'O' if Repairs are Required

PM Workorder Number:________________ **Repair Workorder Number:______________**

	OPERATIONAL CONTROLS		**INTERIOR (continued)**
	Check horn for proper operation		Check operation of door emergency release
	Check for Safety Belt Warning light w/key on		Insp. fire ext. charge pressure, mount, & date
	Check for Key in Ignition Warning w/door open		Check inventory of first-aid kit
	Check for Charge System Warning w/key on		Check inventory and cond. of triangle kit
	Observe fuel gauge operation w/key on		Check driver's seat cond., mounts, & adj.
	Check operation of voltmeter		Check inventory of Accident/Vomit kit
	Inspect all operator control function		
	Verify starter only works in Park and Neutral		**EXTERIOR**
	Check condition and operation of throttle		Steam clean engine comp., batts., & radiator
	Check park brake operation and adjustment		Steam clean Telma (no detergent)
	Check B/U lights and alarm in reverse		Inspect skirt/panels for damage
	Check fast idle per manual		Check reflector condition and placement
	Check operation of Low Air Warning system		Inspect fuel door and cap for damage and leaks
	Check door control operation in all positions		Inspect condition of bumpers
	Inspect operation and condition of tilt column		Inspect condition of mudflaps
	Inspect visor condition and adjustments		Inspect running boards for cracks and damage
	Test w/c door interlock		Inspect decal condition
	Check operation and condition of wipers, arms, and links		
	Check and lube manual door opener linkage		**TIRE AND WHEELS**
	Inspect door seals for wear and damage		Check wheels for missing or loose hardware
	Check op. of rear emergency exit door		Inspect wheel studs for damaged threads
	Lube door mechanisms		Inspect tires for damage
	Apply silicone spray to door seals		Check and adjust tire pressure
	Check hardware at door motor base plate		Measure and record tread depth
	Inspect Security System per manual		Check valve stems for damage & caps
	Check operation of heat/defrost blowers		Inspect wheels for damage, cracks, & rust
	Test all HVAC controls		Check condition of hubo and mounts
	Check for illumination at HVAC controls		
	Inspect all exterior lamps for op. and condition		**BATTERIES**
	Inspect all interior lamps for op. and condition		Remove corrosion. Apply protectant
	Check operation of P/A, mic, and controls		Inspect terminals and ends for damage
	Check driver's auxiliary fan operation		Inspect condition of battery hold downs
	Check glow plug operation		Lube battery tray slides
			Load Test Results: (minimum 9.6 VDC)
	INTERIOR		**Battery #1:_______ VDC**
	Check all latches on compartments and panels		**Battery #2:_______ VDC**
	Check operation of washers. Refill as needed		
	Inspect seat/shoulder belt for cond. and op.		**UNDERCARRIAGE**
	Check operation of emergency alarm system		Check front end caster
	Check farebox operation and mounts		Check front end camber
	Check destination sign operation and light		Check front end alignment
	Test chime system operation		Verify vehicle sets level
	Inspect mirror mounts and adjustments		Inspect for dam. suspension components
	Inspect interior for wear and damage		Inspect shocks and mounts for wear and leaks
	Inspect flooring for wear, damage, and hazards		Check steering linkage for wear and damage
	Inspect all glass condition		Inspect ball joints for wear (1/32" max.)
	Lube emergency latches and check operation		Inspect steering gear and related components
	Inspect all rails and stanchions for tightness		Inspect tie rod ends and drag link ends for wear
	Inspect seat mount hardware for looseness		Inspect sway bar and bushings for wear
	Check condition of all decals and warnings		Check steering pump for leaks and mounts
	Check operation, latch, & seals of escape hatches		Check hydraulic lines for routing, wear, & leaks

	UNDERCARRIAGE (continued)		**WHEELCHAIR SYSTEM**
	Check for loose caliper attachments		Cycle lift
	Check condition of linings and pads		Check all safety and operational functions
	Inspect ABS components for dam. & function		Check safety belt operation, mounts, & cond.
	Verify vent at res. is not plugged		Check hydraulic fluid level in reservoir
	Check for worn rotors and drums		Inspect all handrails and barriers
	Inspect powertrain mounts for wear & damage		Test door alarm
	Check wheel bearings for proper adjustment		Check remote function and condition
	Check for worn torsion bar bushings		Check condition of lap belts
	Remove water from air tank		Inspect securement tracks for damage & op.
	Inspect air suspension components for damage		Check operation of door light and latch
	Soap test air bags for leaks		Inspect mounts of lift structure
	Check pinion seal and wheel seals for leaks		Lube arms, pins, and hinges
	Check u-joints for wear and damage		Manually operate lift
	Inspect exhaust system for leaks & damage		
	Drain secondary fuel filter of water		**AIR CONDITIONING SYSTEM**
			Inspect hoses, clamps, and fan guard
	LUBRICATION		Check operation , seals, and switches on w/c door
	Tie rod ends		Check operation of system
	Drag link ends		Check compressor mounts and condition
	Kingpins		Check compressor clutch and wiring
	Driveline and slip joint		Inspect refrigerant hoses and lines
	Door hinges and pins		Check op. and cond. of condenser and fans
	Retarder		Check operational controls front and rear
	Park brake linkage		
	Check differential level. Change if contaminated		**HEATING SYSTEM**
	Drain engine oil		Check operation of controls and cables
	Install plug and tighten		Inspect hoses and clamps
	Replace engine oil filters		Check operation of under seat unit
	Refill with 15/40 to proper level		Check vents, ducts, and controls
	Check transmission level		
	Check power steering fluid level		**BRAKE EFFICIENCY TEST**
			Test #1:_________%
	ENGINE COMPARTMENT		**Test #2:_________%**
	Check coolant level		**Test #3:_________%**
	Check Nalcol concentration. Adj. if needed		
	Check belt tensioners/idlers		**Driveability Test**
	Check condition of belts		Check operation of speedometer
	Check condition of radiator		Check accelerator response
	Check condition of hoses, pipes, & clamps		Check shift quality between all ranges
	Inspect transmission cooler for leaks and dam.		Check operation of overdrive
	Check condition of surge tank		Note any abnormal noises or vibration
	Inspect the cooling system for leaks		Check operation of all cruise functions
	Check condition of air induction system		Check vehicle for dog tracking
	Check function of air restriction gauge		
	Drain primary filter of water		**BRAKE LINING MEASUREMENT (% REMAINING)**
	Test coolant temperature gauge per manual		**Front Brake Pads:**
	Check brake fluid level		**Rear Brake Linings:**
	TRANSMISSION		**Record tread depth:**
	Check fluid level (adjust as needed)		**LF: RF:**
	Inspect wiring and harnesses for damage		**LRI: RRI:**
	Check for leaks		**LRO: RRO:**
	Check linkage for adjustment		
	Perform operation test		
	Inspect lines and hoses for routing and damage		
	Check linkage and cables for routing and dam.		
	Inspect mounts for wear		
	Inspect retarder mounts and supports		

	ADDITIONAL TASKS FOR 'D' AND 'H' INSP.		**ADDITIONAL TASKS FOR 'H' LEVEL INSP.**
	Tighten/retorque air ride suspension hardware		Take engine oil sample
	Change transmission fluid and filter		Take transmission oil sample
	Drain differential. Refill to proper level		
	Replace primary fuel filter		**ADDITIONAL TASKS FOR 'B' AND 'F' LEVEL INSP.**
	Replace secondary fuel filter		Replace secondary fuel filter
	Replace air filter element		
	Flush power steering system		
	Check and clear stored engine codes		
	Pressure test the cooling system		
	Check retarder air gap per manual		
	Check condition of retarder control box		
	Check and clear transmission stored codes		

DEFECTS FOUND ON INSPECTION

Mechanic Signature:________________	**Supervisor's Signature:**________________
Date Inspection Performed:____________	**Date Workorder Posted:**____________

25' CUT AWAY VEHICLES

Vehicle #	Last H Service	5,000 A	10,000 B	15,000 C	20,000 D	25,000 E	30,000 F	35,000 G	40,000 H
2101	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2102	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2103	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2104	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2105	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2106	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2107	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2108	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /
2109	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /	W/O MIL / /

SUPPORT VEHICLES

Vehicle #	LAST H SERVICE	3,000 A	6,000 B	9,000 C	12,000 D	15,000 E	18,000 F	21,000 G	24,000 H
140 trailer	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /
143 new FL	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /
144 trailer	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /
145	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /
149 old FL	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /
150	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /
152	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /
160	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /
162	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /
164	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /	W/O MILES / /

Appendix H

Quality Assurance / Quality Control Plan

This page left blank intentionally.

Columbia River Crossing Quality Assurance Manual

Technical Manual

DRAFT

September 2009

Title VI

The Columbia River Crossing project team ensures full compliance with Title VI of the Civil Rights Act of 1964 by prohibiting discrimination against any person on the basis of race, color, national origin or sex in the provision of benefits and services resulting from its federally assisted programs and activities.

Americans with Disabilities Act (ADA) Information

If you would like copies of this document in an alternative format, please call the Columbia River Crossing Project office at (360) 737-2726 or (503) 256-2726.

DRAFT

TABLE OF CONTENTS

DRAFT

List of Figures

DRAFT

ACRONYMS

AFR	Audit Finding Report
CRC	Columbia River Crossing
CRC QM	CRC Quality Assurance Manager
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
NCR	Non Conformance Report
PMP	Project Management Plan
QA	Quality Assurance
QC	Quality Control
QAM	Quality Assurance Manual

DRAFT

This page intentionally left blank.

DRAFT

1. Management Commitment Statement

The quality of the Columbia River Crossing project is the ultimate measure by which taxpayers of Oregon and Washington, and all people who will ultimately use this new facility, will judge the success of the project. It is the policy of the project team that the project will be planned and constructed with the highest regard for quality in all areas such as environmental, scheduling, design (both preliminary and final), geotechnical investigations, surveys, bidding, construction, maintenance, and ongoing serviceability and usability for years to come.

Quality assurance practices provide one of the most effective means of controlling, guiding, and improving planning, environmental concerns, scheduling, design, safety costs, reliability, construction quality, and longevity of the project. As such, the Columbia River Crossing project team considers the use and implementation of sound quality assurance practices to be of the utmost importance and a critical element in the delivery of the Columbia River Crossing project.

The Project Management team will identify quality objectives, specify quality-related activities, and oversee solutions to any and all issues to achieve these objectives, and will assign responsibilities for implementation and successful completion of the project.

It is the intent of the Columbia River Crossing project that quality assurance be a team effort encompassing all persons and organizations participating in the development of the project from initiation to completion. The entire project team, including those providing management, planning, scheduling, design, construction, consulting, or other services, is responsible for producing quality results, and is committed to the full and faithful execution of the Columbia River Crossing Quality Assurance Program.

____

Doug Ficco, PE
Project Director
Columbia River Crossing

____

Date

DRAFT

This page intentionally left blank.

DRAFT

2. Introduction

As an obligation to the people of Oregon and Washington, the Federal Highway Administration (FHWA), and the Federal Transit Administration (FTA), as well as funding requirements relating to grantees undertaking capital programs, the Columbia River Crossing quality management team is required to prepare a Project Management Plan (PMP) that includes a quality program comprised of written quality policies and procedures, as well as identification of a management team that supports and takes responsibility for quality and personnel who undertake quality assurance (QA) and quality control (QC) activities. The overall requirements of the project's QA program are outlined in the PMP. The Columbia River Crossing Quality Assurance Manual (QAM) provides further requirements, responsibilities, and definitions for the implementation of the project's quality program.

This document and the QA and QC procedures are designed in response to the FTA's *Quality Assurance and Quality Control Guidelines* that are fully described at www.fta.dot.gov. The FTA guidelines specify 15 quality elements. These elements are used as the basis for section 3.0 of this document.

The Columbia River Crossing Quality Assurance Program provides for the implementation of administrative and quality control measures during preliminary investigations, Environmental Impact Statement (EIS), and preliminary engineering design. The controls established within the QAM will facilitate early identification of conditions that might, if not identified, adversely affect satisfactory completion of the project or this phase of the project. The administrative and control measures adopted by the Columbia River Crossing project team will be prepared and implemented in such a manner as to contribute to and document the successful completion of a safe, reliable, economical, and convenient public transit/transportation system.

Throughout the Columbia River Crossing project, all proposal document(s) and contract(s) for engineering or other required services will be reviewed to determine the level of quality-related activities required to be implemented by the QAM. The quality program for each phase or contract is to be based on its size, complexity, uniqueness, and impact on the safe and efficient preliminary design of the Columbia River Crossing project.

The controls necessary for preserving the integrity of quality-related activities and the required documentation of the results are categorized as follows:

- documentation to include a review of the EIS and studies leading to its preparation;
- public involvement efforts at all levels;
- project planning and implementation;
- financial plan development;
- preliminary engineering design; and
- preliminary contract documents to verify that all quality aspects have been considered.

It is important to note that QA and QC program will necessarily intensify as the project moves toward construction. It is important to perform quality work during the early phases of a project, such as the environmental and planning analyses. During the preliminary engineering phase, options are still being explored that result in more and more refinements of the design. The QA and QC procedures and protocols that are appropriate for the construction phase and the preparation of the plans, specifications and estimate phase are not appropriate for the preliminary engineering phase because they are too detailed. However, QA and QC procedures and protocols should be used in the preliminary engineering phase that can be enhanced and expanded in the subsequent phases.

A more refined and robust QAM will be developed to cover the activities associated with the final design and construction phases. Sections 3.5 through 3.12 in this document are simply placeholders for the more refined plans that will be addressed in subsequent revisions of this QAM.

2.1 PURPOSE/OBJECTIVE

The purpose of the QAM is to provide the processes for implementation of the Columbia River Crossing Quality Assurance Program (QA program) through written procedures, plans, and audits, including the documentation of such activities. The objective is to attain the required level of quality during preliminary investigations, EIS development, public input, and preliminary design.

2.2 SCOPE

The QA program encompasses all activities related to the initial planning, public involvement, preliminary and final site investigation, environmental concerns, and preliminary design of the project. Consultants (including sub-consultants) will conform to the applicable QA program requirements, or utilize approved QC procedures for their work.

It is the intent of the Columbia River Crossing project team to ensure that the agency has an effective and complete QA program throughout the entire course of the project. As such, each consultant/sub-consultant will be required to abide by the QA Plan.

2.3 RESPONSIBILITIES

The CRC QM is responsible for the administration of the QAM. The CRC QM has been delegated the authority and organizational freedom to:

- Identify and evaluate any and all quality problems; and
- Initiate, recommend, or provide solutions and to control further preliminary design, investigations, public input, etc, of non-conforming or deficient items or services until proper disposition is obtained.

The CRC QM will ensure that schedule and cost considerations do not compromise quality and will have complete, unhindered, and ready access to the Project Director to report on quality concerns. For administrative and organizational purposes, the CRC QM reports to the Assistant Deputy Project Director.

DRAFT

The CRC QM also has specific authorization and authority to bring any and all quality issues directly to the attention of the Deputy Project Director or the Project Director.

The initial responsibility for compliance with the QA program falls to the consultant Task Leads/Managers. Their submittal(s) will be reviewed by the agency Task Leads/Managers on behalf of their respective agencies (ODOT, WSDOT, TriMet and C-TRAN) for comment, approval, and acceptance prior to implementation. The basis for the review, approval, and acceptance may include this document, States of Oregon and Washington guidelines and requirements, FTA quality guidelines of the quality-related specification sections in the contract documents, and other documents and requirements as deemed necessary.

The organizational chart for the CRC is found at the end of this section. The organizational chart identifies those with responsibility for QA (managers and leads for each specific CRC organizational element) as well as the management section and the CRC QM.

2.4 IMPLEMENTATION

The Columbia River Crossing QAM will be implemented in accordance with the project's needs and the procedures contained in this document. The CRC QM has the responsibility to review project proposal documents to identify which sections of this QAM are applicable. The need for developing and providing a consultant/sub-consultant QA/QC program(s) will be included in all requests for proposals, as required.

2.5 REVISIONS

Revisions to and maintenance of the QAM are the responsibility of the CRC QM in collaboration with the Deputy Assistant Project Director. Revisions will be made as they become necessary. An overall review of the program will be made annually, or more often if necessary, to determine if any revisions are warranted. The CRC QM will implement changes to the QAM. The QAM is a Columbia River Crossing controlled document. Revisions to the program will also be distributed as a controlled document.

Whenever revisions occur, all holders of copies will be distributed copies of the revised procedure.

2.6 PRECEDENCE

In the event that there is any discrepancy between the PMP and this QAM, the PMP will take precedence, and either or both documents will be subsequently revised to return the two documents to alignment.

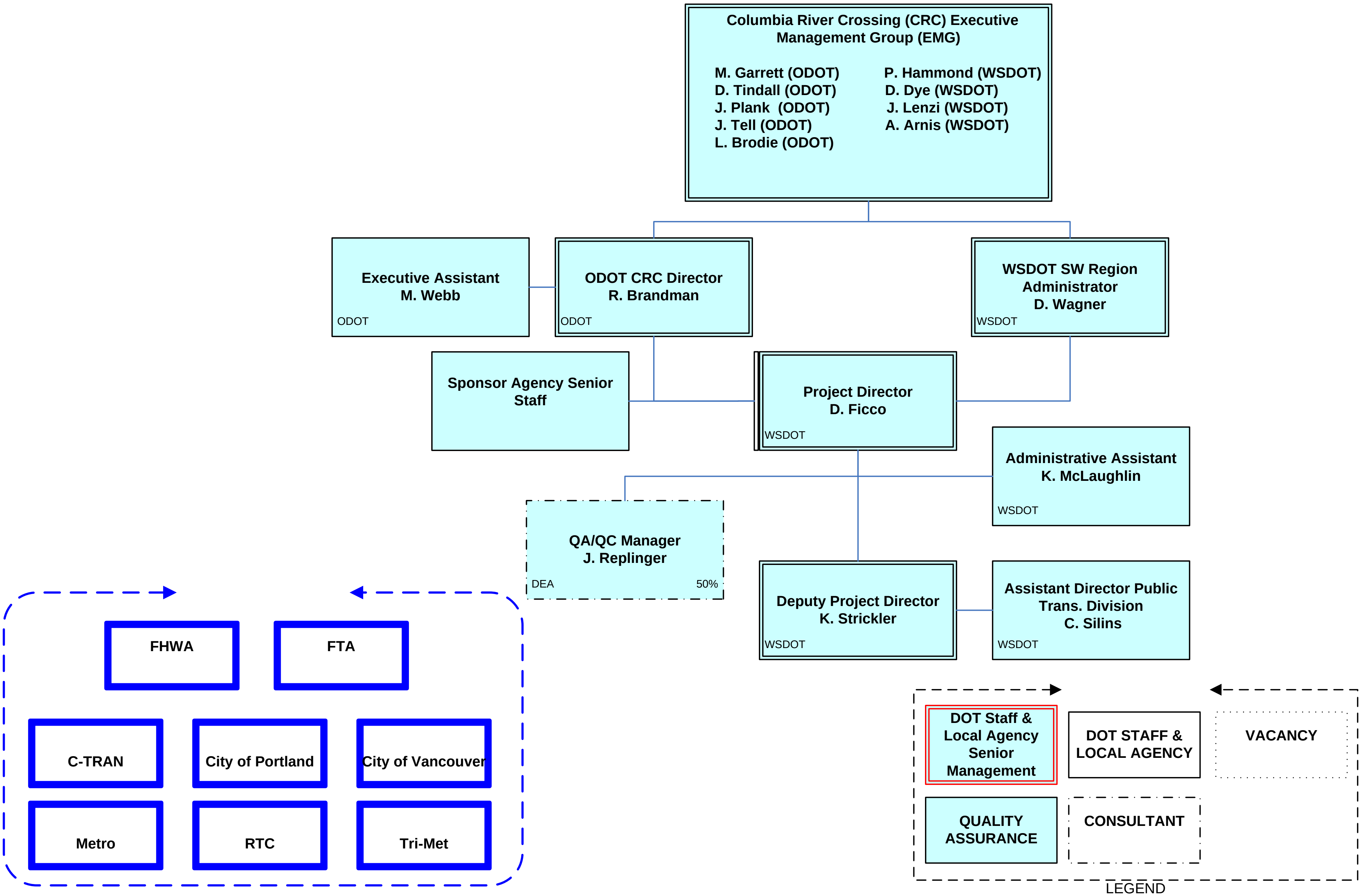
DRAFT

This page intentionally left blank.

DRAFT

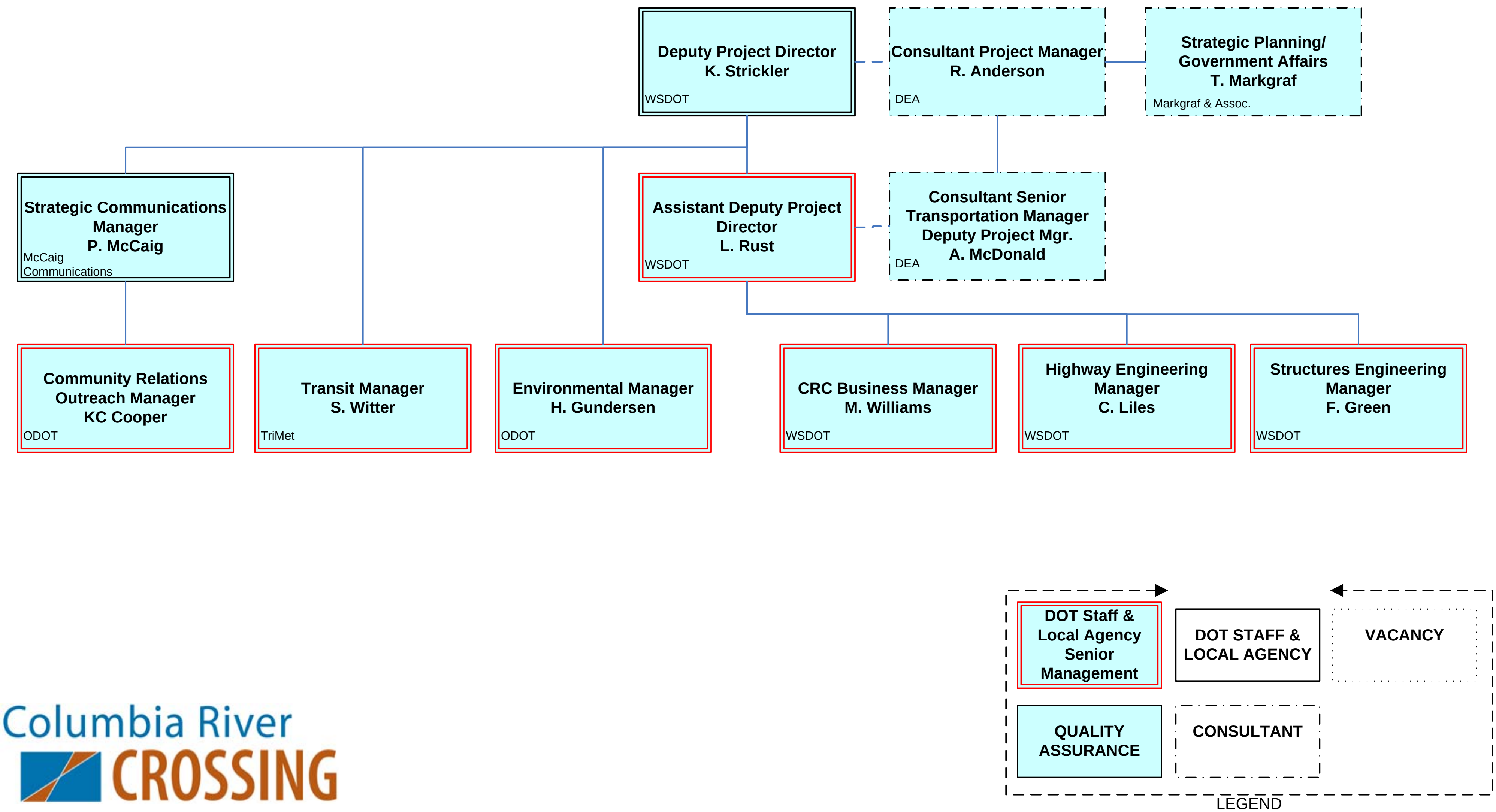
Columbia River CROSSING

Columbia River Crossing Executive Management



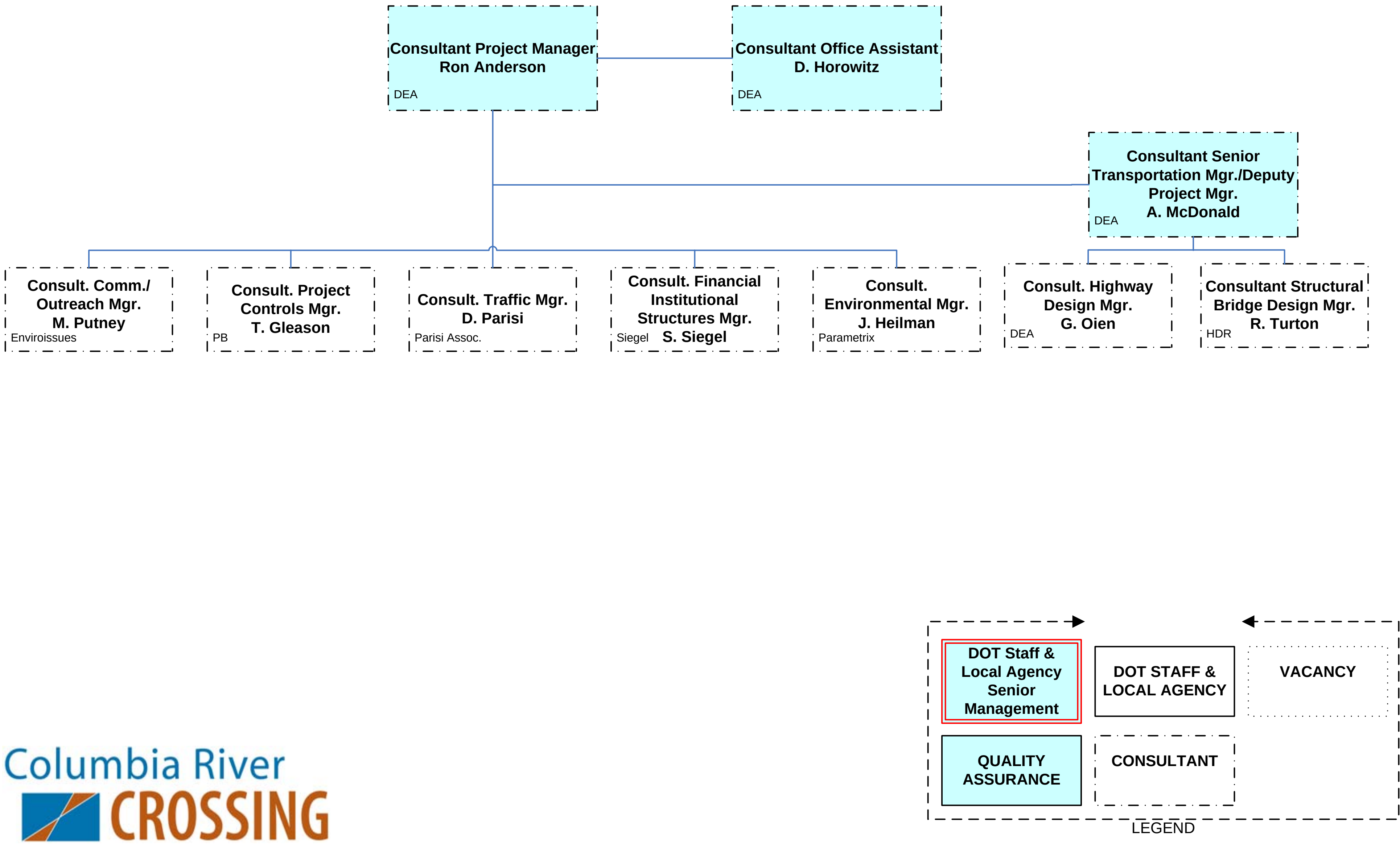
Agency Participants

Columbia River Crossing Management Group

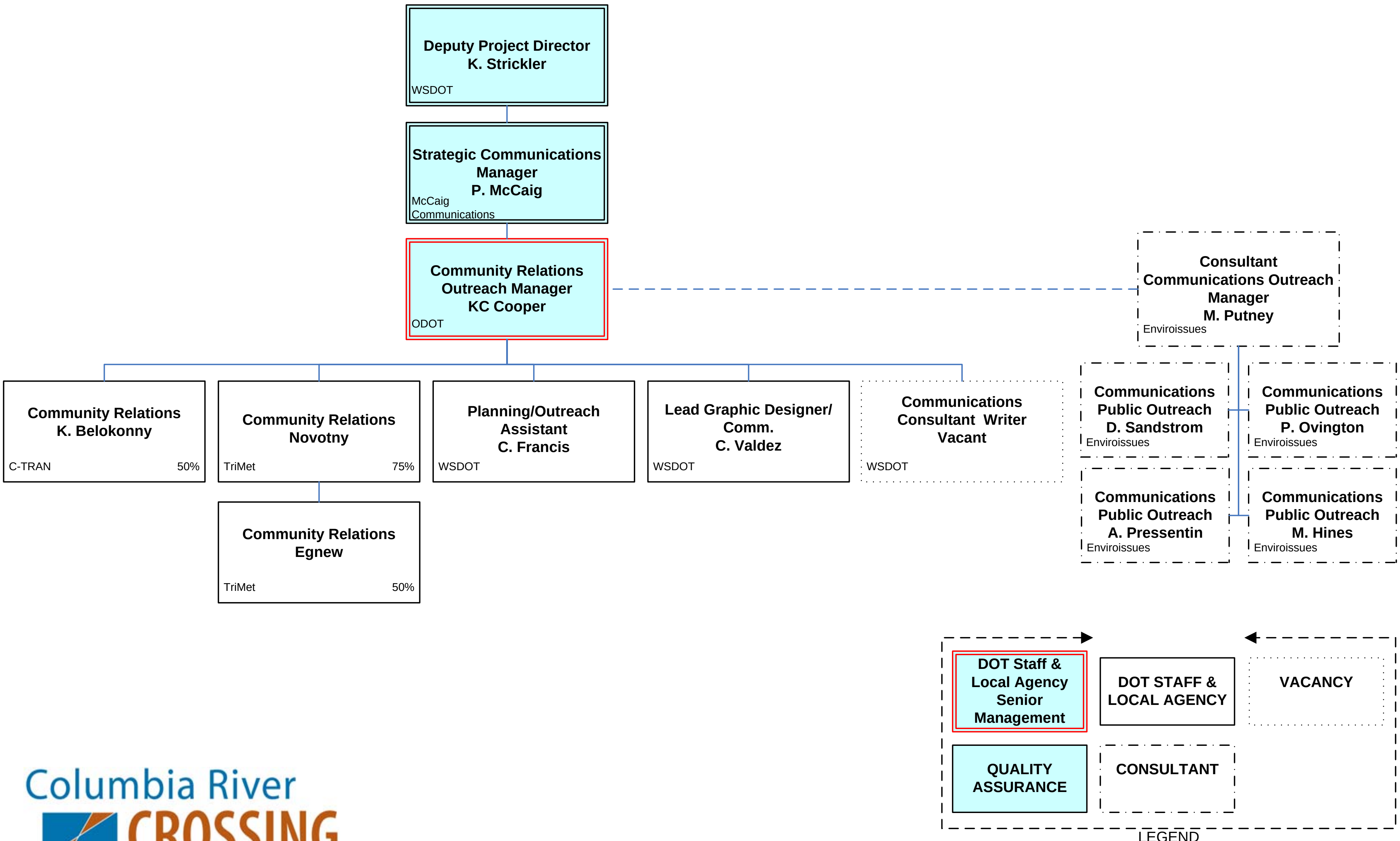


Columbia River CROSSING

Columbia River Crossing – Consultant Management Group



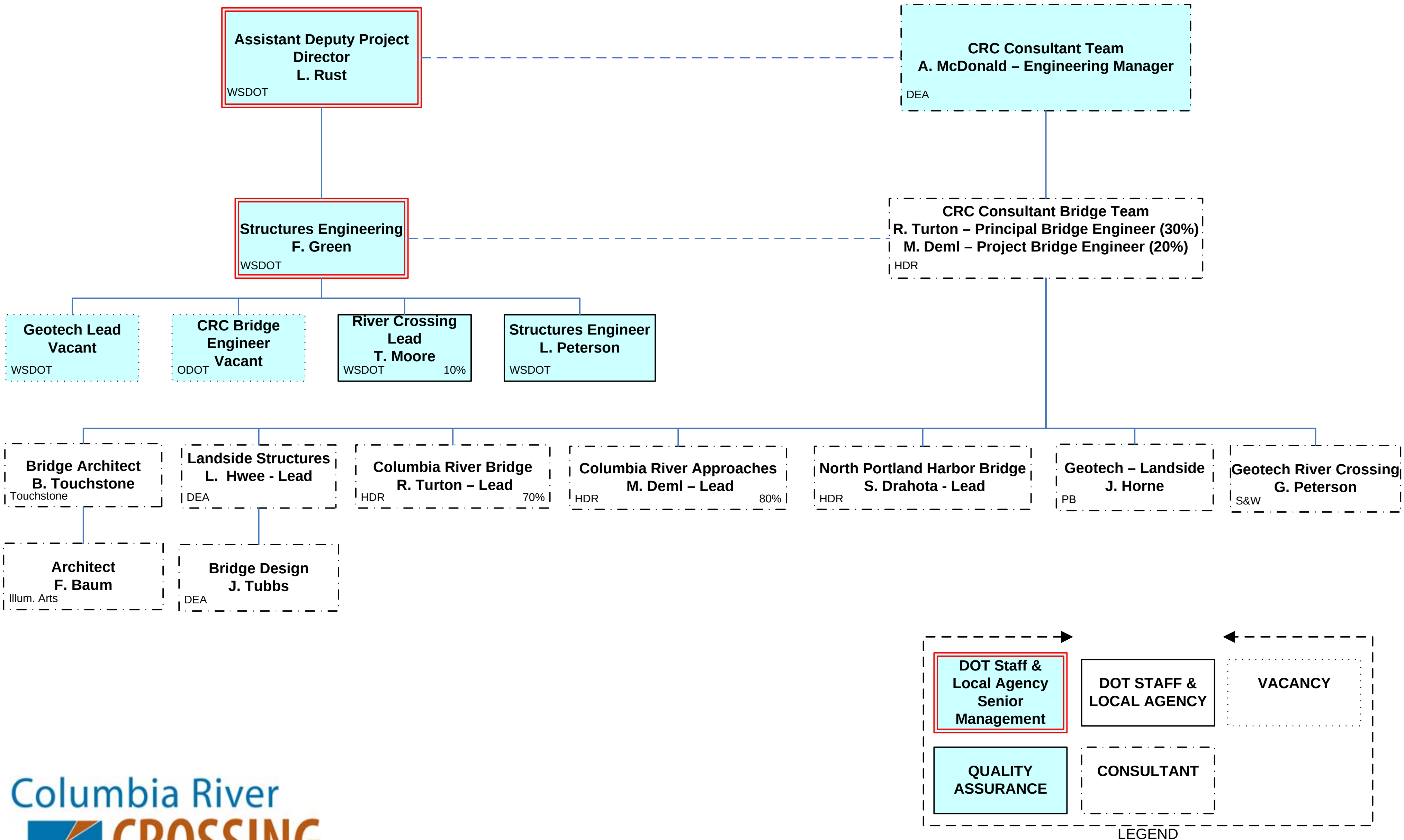
Columbia River Crossing Communications Group



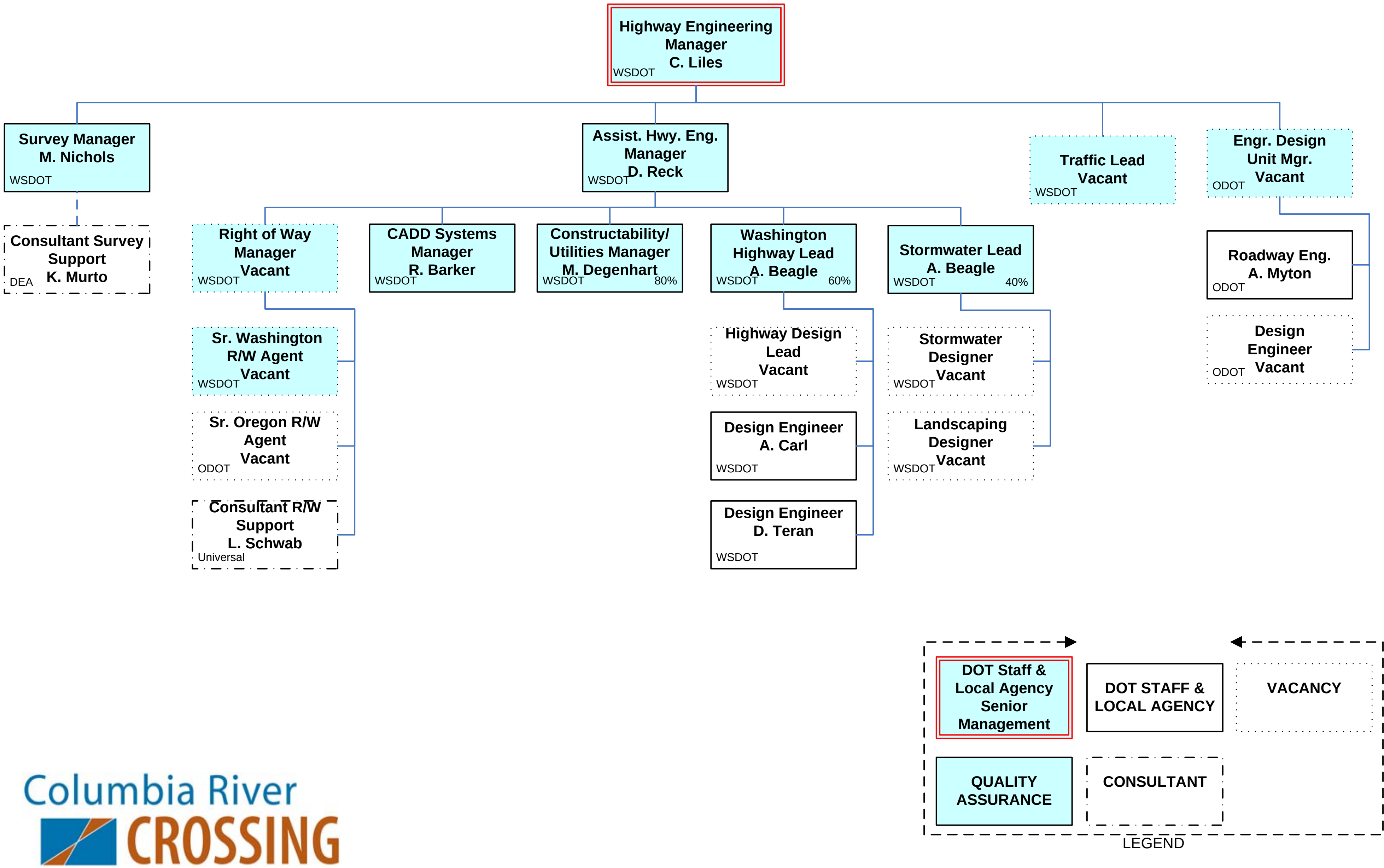
Columbia River CROSSING

8/18/2009 1:30:27 PM

Columbia River Crossing Structures Engineering Group

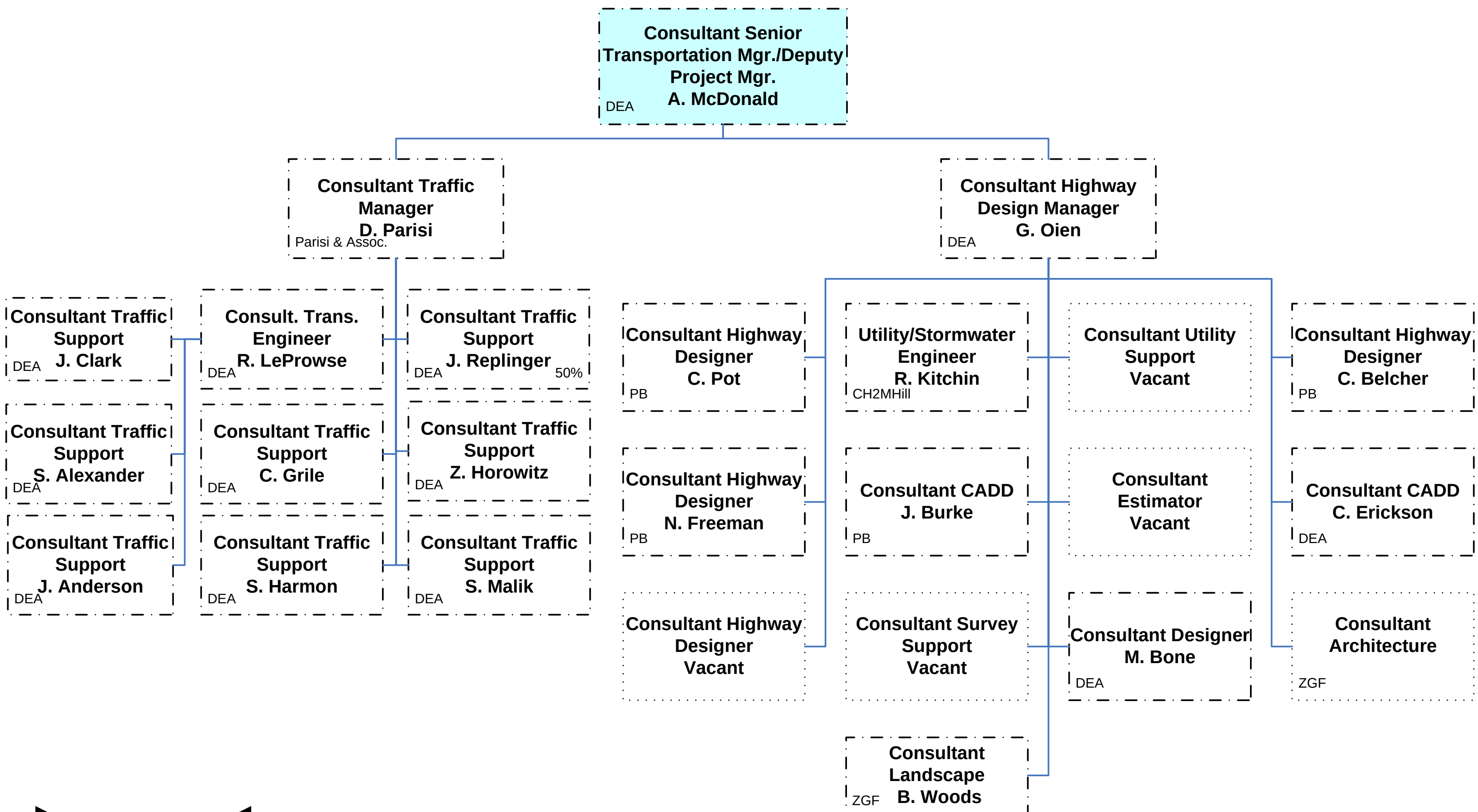


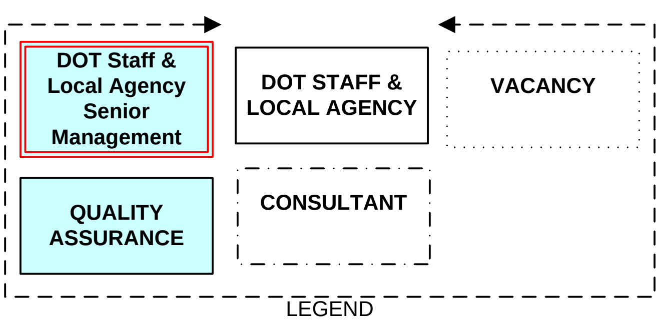
Columbia River Crossing Highway Engineering Group



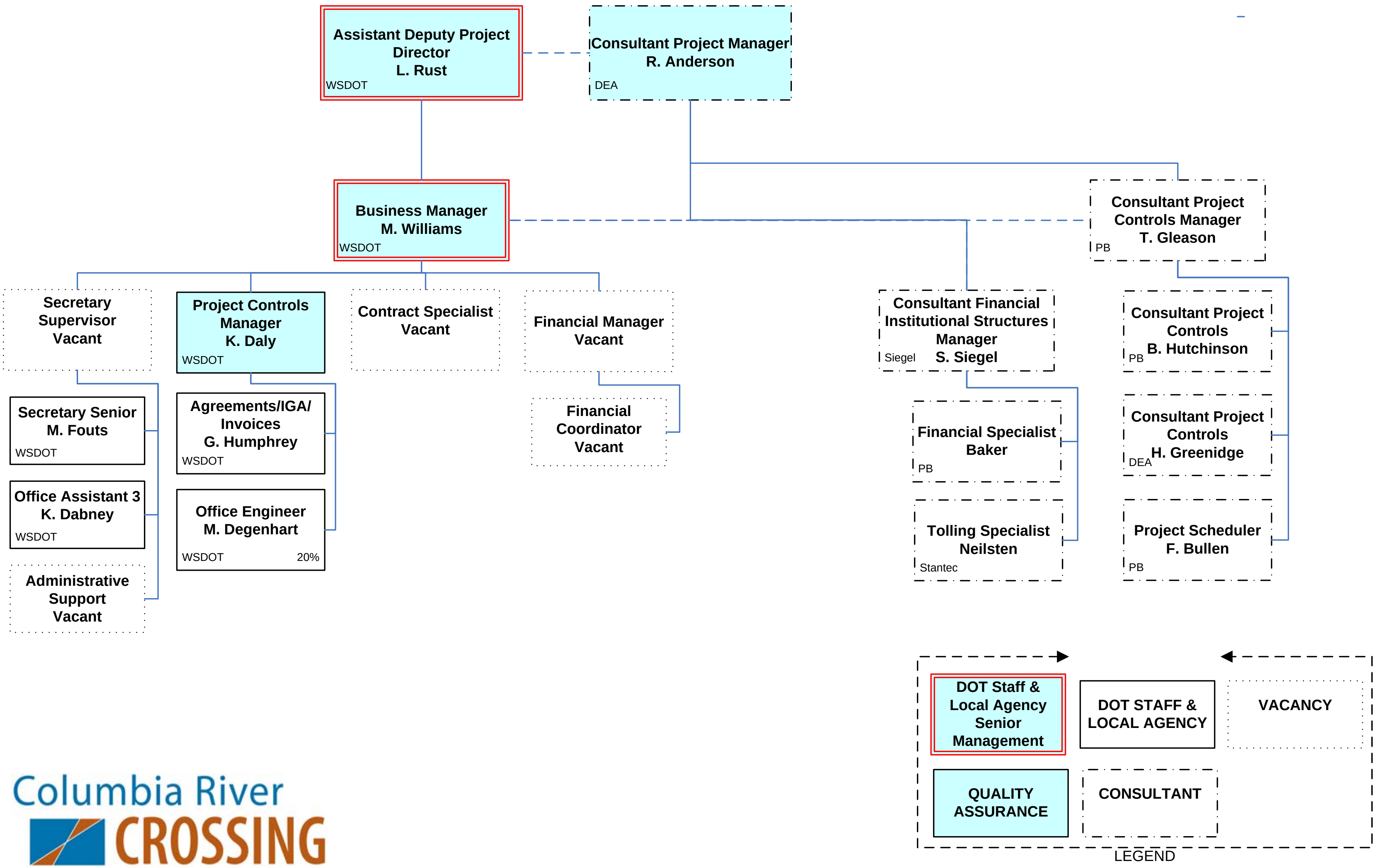
8/18/2009 1:30:27 PM

Columbia River Crossing Consultant Highway Engineering Group





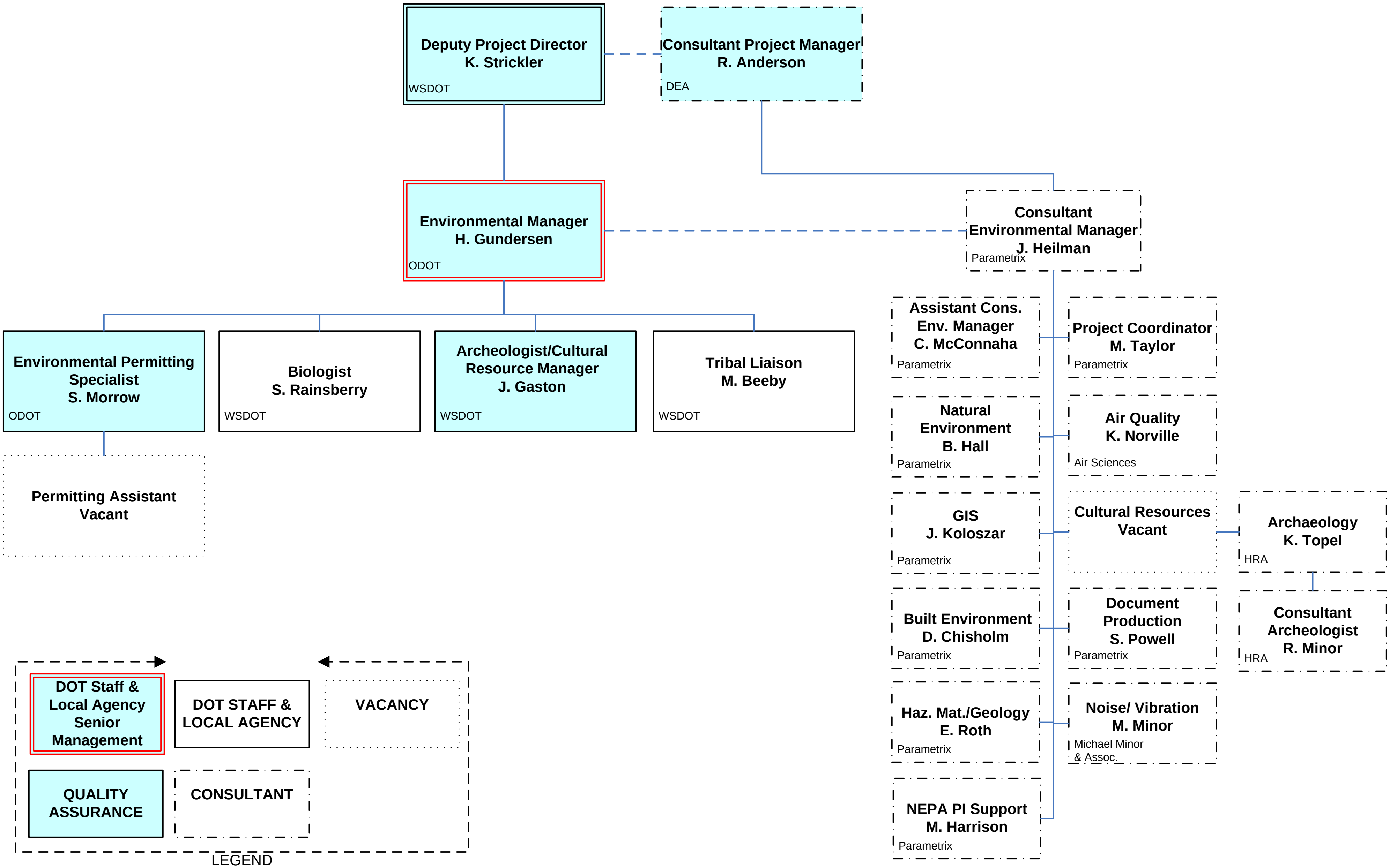
Columbia River Crossing Project Controls/Business Management Group



Columbia River CROSSING

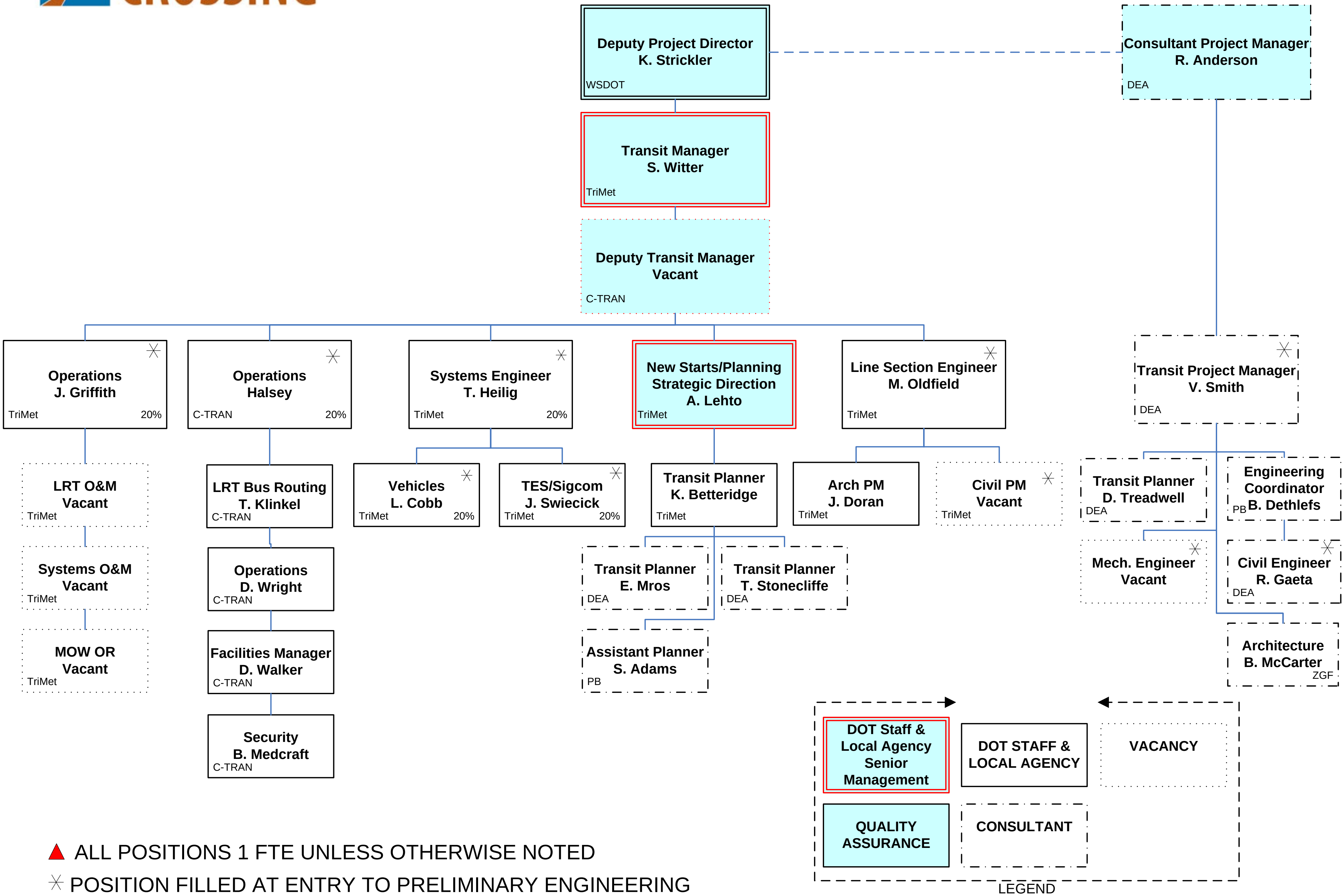
8/18/2009 1:30:27 PM

Columbia River Crossing Environmental Group



8/18/2009 1:30:27 PM

Columbia River Crossing Transit Engineering Group



▲ ALL POSITIONS 1 FTE UNLESS OTHERWISE NOTED

⚹ POSITION FILLED AT ENTRY TO PRELIMINARY ENGINEERING

8/18/2009 1:30:27 PM

Columbia River CROSSING

Consolidated QA/QC Responsibility Matrix (per the CPD QA Program Manual)

		Responsibility					
Section	**Activity Description**	**Designer/Analyst**	**Specialty Lead**	**CADD Manager**	**Specialty Manager**	**Project Director**	**QA Mgr/Staff**
1	Development , establishment, implementation and evaluation of the QAPM.						X
2	Day-to-day management of QAPM requirements.				X	X	
2	Administration and Implementation of the QA Program.						X
2	Review all proposals prior to issuance and determine quality program requirements.						X
2	Review and comment on the contractor's proposed Quality Plan.						X
2	Verifying the effectiveness of the QA manual.						X
2, 3, 5	Develop, implement, document and maintain a QC Plan for their work.	X	X				
3	Overall coordination of design effort.					X	
3	Coordination with Design Lead for electronic document management effort.			X			
3	Coordination of all items related to their assigned specialty.				X		
3	Oversight of design as it relates to cost/schedule (coordinate with Proj Dir).				X		
3	Audit the design process to verify that the QC plan has been implemented.	X	X				X
3	Examine the consultants QC documentation to verify that the QC record is complete.						X
3	Performing design reviews in accordance with the PMP.	X	X				
3	Completeness and accuracy of TriMet's design reviews.					X	
3	QA activities and quality issue disposition for design activities.						X
4	Development and implementation of the document control system.				X		X
4	Organization and control of internal files and for providing required documents to CRC for inclusion in the document control system.	X	X				
4	Document/drawing management system	X	X	X			
4	QA verification of the document and drawing control systems.						X
5	Not applicable at this time						
6	Not applicable at this time						
7	Not applicable at this time						
8	Not applicable at this time						
9	Not applicable at this time						
10	Not applicable at this time						
11	Not applicable at this time						
12	Not applicable at this time						
13	Establishing and maintaining quality records.	X	X	X		X	X
13	Assembling, preparing and maintaining all quality records for archiving.						X
13	Perform audits of quality records.						X
14	Performing or having performed quality assurance audits.						X
15	Training of their staff.	X	X				
15	Ensuring that training for CRC staff is adequate and complete.						X

Figure 2.6-1

This page intentionally left blank.

DRAFT

3. QUALITY ASSURANCE PROGRAM IMPLEMENTATION

3.1 Management Responsibility

3.1.1 Purpose

This section describes the management responsibility, organizational structure, and chain of command for QA/QC activities to be implemented during the preliminary design of the Columbia River Crossing project by the consultants, sub-consultants, and others involved in the successful completion of the Columbia River Crossing project.

3.1.2 Scope

These QA requirements apply to Columbia River Crossing and its consultants, sub-consultants, and all others who will perform activities that affect the overall quality of the project.

3.1.3 Policy

Authority, accountability, and responsibility of the Columbia River Crossing QA team must be identified for each organization, consultant, and sub-consultant. The management structure, function, and chain of command of each contributing organization should be clearly established.

3.1.4 Quality Program Procedures

Organization

The CRC organizational chart is included in section 2 of this document.

The structure for any organization assigned to perform work affecting quality will be that organization’s responsibility, subject to approval by the CRC QM or those delegated by the Columbia River Crossing project team. Each QC program and staff organization will be structured in such a manner that:

1. Quality is achieved and maintained by those who have been assigned responsibility for performing the work. This is accomplished by utilization of QC plans and procedures already in place or by use of those embodied in the overall Columbia River Crossing QA program.

2. The organization responsible for quality will have sufficient authority, access to work areas, and organizational independence to identify quality problems, verify implementation of solutions, and assure that further processing or delivery is controlled until proper disposition of a deficiency, nonconformance, or unsatisfactory condition has been completed.

3. Appropriately qualified personnel will verify compliance with all aspects of the QA/QC program. To determine its effectiveness, they will perform planned and scheduled audits.

Personnel who do not have direct responsibility for performing the activities being audited will perform these audits in accordance with the Columbia River Crossing project's written procedures and/or checklists. Audit results will be documented and reported to and reviewed by the CRC QM and responsible management. Follow-up responses and corrective actions will be implemented where appropriate.

4. Quality achievement is verified via quality audits, quality surveillance, and first-level QC reviews of work products performed by persons or organizations not directly responsible for performing the work.

5. Quality verification persons or organizations will report to a level of management that provides sufficient authority and organizational freedom to assure that appropriate action is taken to resolve conditions adverse to quality.

Program Assessment

The adequacy and effectiveness of the project quality program will be regularly and formally assessed by the management of organizations implementing the programs and by the CRC QM.

3.1.5 Responsibilities

The CRC Project Director is ultimately responsible for the overall quality of the Columbia River Crossing project.

The Project Director has assigned the responsibility of assuring the development, establishment, implementation, and evaluation of the project's QA program to the CRC QM.

The CRC QM is responsible for:

- Assuring that the project's QA program is established and maintained.
- Providing consultation and direction regarding quality issues to design, and other project tasks.
- Monitoring the quality program implementation and evaluating adequacy and effectiveness.
- Coordination of the project's QA program with the consultants' QA/QC plans to ensure that Columbia River Crossing project quality policies are not compromised.
- Resolving conflicts regarding the intent of the QA program.
- Review and approval of consultants' and sub-consultants' QA programs for compliance.

The CRC QM is provided with the complete organizational freedom to investigate quality-related activities in all areas of the project and to identify any quality problems. The CRC QM retains authority to control further preliminary design, investigations, and/or public input of a nonconforming or deficient item or service until proper disposition has been obtained; to initiate, recommend, or provide solutions; and to verify implementation of solutions. In matters of quality, the CRC QM will have complete and ready access to the Task Managers, the Deputy Assistant Project Director, the Assistant Project Director and the Project Director.

DRAFT

Any decision made by the CRC QM regarding the applicability or interpretation of the QA program to consultants, sub-consultants, or others who may work on the project is subject to review only by the Project Director.

The CRC QM reports to the Deputy Assistant Project Director for administration purposes.

3.2 Quality Assurance Program and Documentation

3.2.1 Purpose

This section describes the Columbia River Crossing project QA program and assigns responsibility for developing, approving, and implementing quality procedures.

3.2.2 Scope

The QA program described here applies to all project quality-dependent activities and participants.

3.2.3 Policy

The Quality Policy Statement requires a QA program to ensure that the expected level of quality is achieved. Implementation of the Columbia River Crossing QA program is described throughout this QAM.

3.2.4 CRC Quality Assurance

The QA program for the Columbia River Crossing project consists of three elements, as follows:

1. The governing policies and general requirements specified in the PMP's Quality Policy Statements and this QAM.
2. A Quality Assurance/Quality Control Plan prepared for major tasks for consultants and sub-consultants.
3. Supplemental plans, procedures, or instructions that describe how additional quality-related activities are to be performed, implemented, and verified.

QA program policies will comply with FTA quality assurance guidelines, quality-related requirements of the contract documents, and other documents or requirements as deemed necessary.

Consultants and sub-consultants will each be required to adhere to the requirements and standards set forth in this QAM and their own internal quality control programs, which will be reviewed and approved by the CRC QM.

All task-specific QC plans must meet the following minimum requirements:

1. Have been reviewed by task managers within the last 12 months.
2. Include provisions for annual review.

DRAFT

3. Be distributed to key project personnel.
4. Include QC procedures for independent or peer review of compiled data, calculations, technical reports, and drawings.
5. Provide for appropriate documentation of undertaking QC activities and written responses to review comments such that quality program implementation can be audited or verified.

Task QC plans will include appropriate approval signatures and must be submitted to the CRC QM for review, comment, and approval. The CRC QM will confer with the Assistant Deputy Project Director prior to the issuance of a final decision on acceptance or rejection of the proposed QC plan.

The Columbia River Crossing QA program will be subject to an annual review.

This QAM will be evaluated by Columbia River Crossing upper management (Assistant Deputy Project Director, Deputy Project Director and Project Director) to ensure adequacy and effectiveness of policies and personnel.

Consultants' QA/QC plans will be reviewed by the CRC QM to assess the adequacy and effectiveness of policies and personnel.

3.2.5 Responsibilities

The CRC QM's responsibilities are outlined in Section 3.1.5

Columbia River Crossing personnel performing quality functions will be qualified by training and/or experience and be subject to the approval of the CRC QM.

Consultants are responsible for developing, implementing, and maintaining a QA/QC plan that satisfies the requirements of their current contract documents. In the event a consultant subcontracts a portion of the work, the accountability for the QA/QC plan remains with the primary consultant. The primary consultant may, however, delegate responsibility for portions of the plan to the performing sub-consultant, subject to CRC QM approval.

The CRC QM is responsible for verification of all review procedures and disposition of quality issues.

DRAFT

Columbia River CROSSING

EXAMPLE

CAPITAL PROJECTS DIVISION
Document Review Comment Form

Reviewer's Name (Print):________________________

Review Organization:___________ Date:_________

Document Reviewed:___________________________

TriMet MASTER COMMENT NO.	Reviewer's Comment No.	Drawing/Page/Item Number	REVIEWER'S COMMENTS	CONTRACTOR'S RESPONSE	ACTION CODE

Action Codes:
1. No exception taken
2. Exceptions noted, resubmittal not required
3. Exceptions noted, resubmittal required
4. Rejected

Figure 3.2-1

This page intentionally left blank.

DRAFT

Columbia River CROSSING

Design Document Review Stamp

(Approximate size of actual stamp.)

Typical items to be contained on the Document Review Stamp (Layout Example)

Original Print Date ________________

Document Activity	Name	Date Completed
Designer		
Drafter		
Designer Check		
QC Check		

Figure 3.2-2

This page intentionally left blank.

DRAFT

3.3 Design Control

3.3.1 Purpose

This section describes the requirements for the quality control of design activities associated with the Columbia River Crossing project. The overall design activity shall be conducted according to the CRC Project Management Plan.

3.3.2 Scope

These requirements apply to all transportation activities conducted within the Columbia River Crossing office and the off-site offices of any consultant/sub-consultant.

The Design Control element applies to all major categories of work including:

- Environmental activities
- Transit activities
- All other transportation activities

3.3.3 Policy

All design consultants and sub-consultants are required to conform to the QAM, approved by CRC QM, and to govern their work in accordance with this QAM.

3.3.4 CRC Quality Assurance

The CRC QM will perform audits and/or surveillance of the preliminary design QC process to verify that the QC plan has been implemented. QA activities will include sampling design documents for adequacy and completeness. QA staff will also examine the consultants' QC documentation to verify that the QC records are complete.

3.3.5 Responsibility

The CRC Task Managers are responsible to develop, implement, and maintain review procedures for their assigned work. This includes internal QC review of deliverables according to the requirements of the PMP and the QAM. The CRC Task Managers will designate staff responsible for review of designated deliverables.

In addition, Task Managers will participate to the extent necessary in reviews by CRC project team members exterior to the task groups (DOT, etc.) and in reviews performed by outside entities such as those required by the InterCEP Agreement.

The CRC QM is responsible for verification of all review procedures and disposition of quality issues.

DRAFT

3.4 Document Control

3.4.1 Purpose

This section describes the processes utilized for the systematic control of documents as further described by Columbia River Project Management Plan.

3.4.2 Scope

These requirements apply to all agency staff or consultant/sub-consultant-prepared documents that are issued as Columbia River Crossing project documents and all documents received by the project.

3.4.3 Policy

Project documents will be controlled in accordance with established document control procedures, and quality control measures will be used to verify conformance as outlined in Section 3.2 above.

3.4.4 CRC Quality Assurance

Document Control: The PMP includes requirements for control of documents. An electronic database will be used for cataloging both incoming and outgoing documents. Documents will be assigned a control number for identification and filing. Document control files will be centralized.

Consultants and contractors for the project will be required to develop a filing system for their documents. All project documents sent to the Columbia River Crossing project office or developed for Columbia River Crossing project's issuance will be incorporated into Columbia River Crossing's document control system and central files. Preliminary drawings will be handled separately and are discussed below.

Drawing Control: Columbia River Crossing has established a computerized, internet-based database system for storage, distribution, and management of all project engineering drawings. Consultants are provided access rights to read and/or write to the files, depending on assigned "ownership" of the individual drawing. Drawings are checked out during design activity and are checked back in no more than three days later. Final drawing production and distribution is the responsibility of Columbia River Crossing project team.

Drawings checked back into the database will be checked by CRC Task Managers for adherence to reviewed standards as follows:

- Reference files will be reviewed on the system before being returned to the database.
- Sheet files will be plotted and reviewed to confirm acceptability.
- Random check plot reviews will be conducted on an ongoing basis.

Quality Assurance: The project document control system and the contractor's document and drawing control systems will be subject to review by the CRC QM at any time.

DRAFT

3.4.5 Responsibility

The Project Controls Manager is responsible for development and implementation of the document control system. Consultant and sub-consultant project managers are responsible for organization and control of their internal files and for providing required project documents to the Project Controls Manager for inclusion in the document control system.

The Columbia River Crossing CADD Systems Manager is responsible for the drawing management system.

The CRC QM is responsible for QA verification of the document and drawing control systems.

3.5 Purchasing, Equipment Procurement, and Construction

Not applicable at this time

3.6 Control of Materials, Product Identification, and Traceability

Not applicable at this time

3.7 Control of Special Processes

Not applicable at this time

3.8 Inspection and Testing Procedures

Not applicable at this time

3.9 Inspection, Measuring, and Testing Equipment

Not applicable at this time

3.10 Inspection and Test Status

Not applicable at this time

3.11 Nonconformance

Not applicable at this time

3.12 Corrective Action

Not applicable at this time

DRAFT

DRAFT

3.13 Quality Records

3.13.1 Purpose

This section describes the requirements for production, collection, filing, and maintenance of QA/QC records.

3.13.2 Scope

These requirements apply to all quality records for the project, including its planning, preliminary design, EIS, public response, etc.

3.13.3 Policy

Written records of QA/QC activities will be prepared, compiled, and stored in a retrievable manner.

3.13.4 Procedures

Quality records will be collected, stored, and preserved in a manner that precludes damage, loss, or deterioration. Quality records may be in either hard copy or electronic form.

Quality records will be maintained to demonstrate conformance to quality-related requirements and the effectiveness of the quality system. They will be available to authorized persons at any time when requested within a reasonable timeframe.

Quality records will be assigned a unique number and a database will be maintained that includes the item description, unique number, location, and responsible authority.

Quality records will be categorized as (1) permanent quality records or (2) non-permanent quality records. Retention time will be as required by applicable law and in accordance with contract requirements.

Permanent quality records, as well as records that may be determined at a later date, are those that involve the following:

- Final design development
- Demonstrated capability for proper function and safe operation of critical items
- Providing required baseline data
- Non Conformance Reports (NCR) and the resolution of the NCR

Non-permanent quality records are those that do not meet any of the above criteria for permanent records.

Quality records are subject to QA audits and or surveillance.

Consultants/sub-consultants are also responsible for retention of their quality records throughout the period of preliminary investigations, preliminary design, etc., in accordance with these requirements.

Storage facilities for quality records should include fire resistant steel file cabinets or other storage containers located within an area having features that preclude damage from fire, condensation, and extreme temperature variation whenever possible. In lieu of fire resistant files, a second (backup) copy of each quality record should be maintained in an area remote from the primary storage area described above.

Columbia River Crossing project staff performing quality control or quality assurance activities are responsible for maintaining quality records in accordance with this section.

All materials generated for the Columbia River Crossing project will be filed in the Columbia River Crossing office at 700 Washington Street, Vancouver, Washington. Unless otherwise stated in the contract, the consultants/sub-consultants' permanent quality records will be turned over to Columbia River Crossing Document Control Manager as they are generated throughout the contract.

Quality Records

Examples of quality records include:

- Design records
- Quality control plans
- Applicable criteria used in preliminary design
- Preliminary design calculations and checks
- Preliminary drawings (standards, reference, directive, contract)
- Preliminary design review report
- Preliminary contract specifications
- Quality assurance system audit and surveillance reports

3.13.5 Responsibility

Consultants/sub-consultants are responsible for establishing and maintaining a comprehensive set of quality records. This item will be addressed in their approved QC plan.

The CRC Document Control Manager is responsible for maintaining, assembling, and preparing all quality records for archiving. While the files are in the possession of the Document Control Manager, accessibility and retrievability of the documents must also be controlled.

The CRC QM or delegated staff will perform audits or surveillance of quality records.

DRAFT

3.14 Quality Audits

3.14.1 Purpose

This section describes the requirements for performing quality audits.

3.14.2 Scope

These requirements apply primarily to QA audits of project QC activities performed principally by Columbia River Crossing project's QA staff (or consultants or sub-consultants) relative to overall project quality activities. Consultants and sub-consultants performing internal QA audits as part of their QC plans may use this procedure or submit one of their own which meets these requirements.

3.14.3 Policy

A program for planned, periodic audits and routine surveillance will be established to ensure full implementation of the project's QA program and the contractor's QC plans. Formal audit findings will be prepared and reviewed with the affected project participants and maintained in quality records for review by the FTA and others.

Surveillance will be performed on a random basis to check/verify conformance to the QA program. Surveillance is not considered as a scheduled audit and is performed to review and assist the Columbia River Crossing project team in verifying conformance to the QA plan. Deficiencies discovered during the surveillance activity will require corrective action(s) and acceptance by the CRC QM or designated staff.

3.14.4 Procedure

A comprehensive program of planned, periodic audits will be established to verify that applicable elements of the QA program and QC plans are acceptable and have been developed, documented, and effectively implemented in accordance with specified requirements. The activities of consultants and sub-consultants will be audited for compliance and implementation of contractually required quality activities, including evaluation of overall program effectiveness.

An auditor will be assigned for each audit performed and is responsible for all elements of the audit. Audit personnel are to have no direct responsibility in the activities to be audited. Auditors will have experience or training commensurate with the scope, complexity, or special nature of the activities to be audited. Auditors will be given access to all records necessary to identify problems, recommend solutions, and evaluate corrective actions.

This section also includes information for quality assurance assessments of daily activities performed by Columbia River Crossing project personnel.

The management of the audited organization will be required to respond to the audit report within fifteen (15) working days after receipt of the narrative and the Audit Funding Report (AFR). Circumstances may arise where responses require additional time or further clarification. Such instances will be resolved directly with the auditor and appropriately documented. The

DRAFT

CRC QM will be advised of any extensions to the required response time. CRC's QM is responsible for accepting or rejecting remedial action responses to audits. The reason for rejection will be stated in writing.

The auditor is responsible for scheduling closeout audits as necessary to verify completion and effectiveness of remedial actions. Deficiencies that continue to exist after the closeout audit may be closed to an appropriate document, such as an NCR, or remain open on the AFR to be addressed during a follow-up audit activity. Every reasonable effort will be made to close out audit findings on the AFR that they originated on.

Audit records are to be maintained and included as project quality records and made available for review. Records include audit schedules, audit plans, audit reports, audit checklists, audit performance records, AFR, and Corrective Action Requests as applicable.

3.14.5 Responsibility

The CRC QM is responsible for performing or having performed quality assurance audits and surveillance in accordance with these requirements.

DRAFT

This page intentionally left blank.

DRAFT

Columbia River CROSSING

EXAMPLE

Quality Assurance Audit Schedule

Page ______ of ______

	20____											
Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Prepared By: ______________________________ Date: ______________

Approved By: ______________________________ Date: ______________

Figure 3.14-1

This page intentionally left blank.

DRAFT

Columbia River CROSSING

Design Activity Audit Checklist

EXAMPLE

Task No.	**Audit No.:**	**Subject:**

Item Description	**Status**		**See Comment No.**
1 Design Criteria (Also see 4. Design Changes for Calculation Checks)			
Are drawings being managed in conformance with procedures?	Y	N	
2 Preparation of Design Documents			
Review prints are being produced per the approved QC Plan:			
Check Print (60% or 100%)	Y	N	
Review Print (In-Progress)	Y	N	
	Y	N	
	Y	N	
3 Design Review and Coordination			
Design Meetings			
Are the following meetings being held on a regular basis with appropriate attendance.			
Task Manager Meetings (bi-weekly)	Y	N	
Engineering Design Coordination (bi-weekly)	Y	N	
Engineering/Traffic/Transit Coordination (monthly)	Y	N	
Are QA reviews performed for design packages submitted to QAM?	Y	N	
4 Design Changes			
Design Calculation Checks			
Verified and signed by a Registered PE in the State	Y	N	
Format elements to include: Project Title	Y	N	
Design Element	Y	N	
Name of Designer	Y	N	
Date of Calculation	Y	N	
Sheet Number	Y	N	
Name of Checker	Y	N	
Date of Check	Y	N	
	Y	N	
5 Document Control Activities			
Plan Checking			
Plan folder(s) reviewed: ____________________			
Separate plan folders are maintained for each plan sheet	Y	N	
Are plan folders maintained in a central, accessible location	Y	N	
Check Box			
Are dates and signatures chronological	Y	N	
Stamps are identified as 'In-Progress' or 'Check' print	Y	N	
Do index descriptions match the drawing title block	Y	N	

Figure 3.14-2

This page intentionally left blank.

DRAFT

Columbia River CROSSING

Audit Finding Report

EXAMPLE

1. Project Task		2. Project Identifier	3. AFR No.:
4. Subject:	5. Audit Number:	6. Discussed With:	7. Issue Date:
8. Responsible Authority:	Phone Number:	9. Auditor Phone Number:	
10. Requirement Reference and Description of Condition:			
11. Causes of the Problem:			
12. Corrective Action:			
13. Responsible Authority:	14. Response Due Date:	15. Response Date:	16. Effective Date:
17. Corrective Action: ☐ Accept ☐ Reject		18. Auditor: Date:	
19. Verification of Corrective Action(s):			
20. Implementation: ☐ Accept ☐ Reject		21. Auditor: Date:	

Figure 3.14-3

This page intentionally left blank.

DRAFT

Columbia River CROSSING

Quality Assurance Audit Log

EXAMPLE

Page _____ of _____

Audit Number	Project Task	Identifier	Subject	Audit Dates	Lead Auditor	Report Issued to QAM	Response Due Date	Response Received	Follow-Up Audit Scheduled	Comments

Figure 3.14-4

As of:___________

DRAFT

This page intentionally left blank.

3.15 Training

3.15.1 Purpose

This section describes the requirements for training personnel performing quality-related activities as described herein.

3.15.2 Scope

These requirements apply to all project personnel involved in or responsible for quality-related activities.

3.15.3 Policy

Personnel performing quality-related activities will be technically qualified for their task and familiar with the project QA program procedures.

3.15.4 Procedure

All personnel performing quality-related activities throughout the lifecycle of the project will be technically qualified for their task on the basis of appropriate education, training, and/or experience. Each person will also be familiar with the project QA program and approved QC plans and review procedures pertaining to their work responsibilities.

The consultant or sub-consultant will establish and maintain records as to participation of key project staff in training or briefings regarding the QA program and QC procedures.

3.15.5 Responsibility

CRC's QM is responsible for ensuring that quality training for Columbia River Crossing staff is adequate and complete. The consultant/sub-consultant Project Managers are responsible for the training of their staff.

DRAFT

This page intentionally left blank.

DRAFT

Columbia River CROSSING

Quality Assurance Program Manual Training Matrix

	QAPM Procedure Number														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Project Director, Deputy Project Director, Assistant Project Director	RA	RA	RA												RA
Project Managers (Outreach, Transit, Environmental, Business, Highway, Structures)	RA	RA	RA												RA
Specialty Leads (Survey, Structures, Highway, Stormwater, Utilities)	RA	RA	RA	RA									RA	RA	RA
Specialty Leads (CADD and Document Control) and Support (CADD and Document Control)	RA	RA	RA	RA									RA	RA	RA
Designers, Analysts, and Support	RA	RA	RA	RA									RA	RA	RA
Quality Assurance Staff	RA	RA	RA	RA									RA	RA	RA

RA = Read and Acknowledge training (See Note 1)

Procedure Number and Title
1. Management Responsibility
2. Quality Assurance Program and Documentation
3. Design Control
4. Document Control
5. Purchasing, Equipment Procurement and Construction
6. Control of Materials, Product Identification and Traceability
7. Control of Special Processes
8. Inspection and Testing Procedures
9. Control of Measuring and Test Equipment
10. Inspection and Test Status
11. Nonconformance
12. Corrective Action
13. Quality Records
14. Quality Audits
15. Training

Note(s)
1. A 'Read and Acknowledge Form' (Attachment 3.15-2) shall be filled out and signed by each individual participating in training on the CRC QA Program Manual.

Figure 3.15-1

This page intentionally left blank.

DRAFT

Columbia River CROSSING

Read and Acknowledge Form
for
Quality Assurance Program Manual Training

The Quality Assurance Program Manual Training Matrix lists the positions within the Project that require training in quality procedures and documentation. The training is in the form of reading and becoming familiar with particular sections of the CRC Quality Assurance Program Manual.

Please note and perform the appropriate training for your position shown on the training matrix.

Please proceed with the "Read and Acknowledge" training at your earliest convenience.

You may contact the QA Manager regarding any questions you have about the manual. When you have read and understand the assigned procedures in the Quality Assurance Program Manual **please circle the corresponding numbers listed below for the sections assigned to your position**, sign and complete the remainder of the form and return it to the attention of the CRC QA Manager.

Procedure Number

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

This is to acknowledge that I have read and understand the CRC Quality Assurance Program Manual procedure numbers identified above for my position as outlined in the QAPM Training Matrix,Section 15.

Name (Print) ______________________________

Signature ______________________________

Position ______________________________

Date ______________________________

Figure 3.15-2

This page intentionally left blank.

DRAFT

Columbia River CROSSING

CRC Quality Assurance Program Manual
Read and Acknowledge Training Form Status

Forms Required			Completed Forms	
Name (Last, First)	Assigned To	Date	Name (Last, First)	Assigned To

This page intentionally left blank.

DRAFT

4. QUALITY ASSURANCE PROGRAM DEFINITIONS

The following definitions are provided to assure a uniform understanding of terms as they apply to the project QA program.

Audit – A documented activity performed in accordance with written procedures or checklists to verify, by examination and evaluation of objective evidence, that applicable elements of the QA/QC program(s) have been developed, documented, and effectively implemented in accordance with specified requirements. An audit should not be confused with surveillance or inspection.

Certification – The action of determining, verifying, and attesting, in writing, to the qualifications of personnel in accordance with applicable requirements.

Certified (Personnel) – An individual certified by a recognized standard or approved as having successfully completed requirements of the standard or procedure.

Change Control – The systematic evaluation, coordination, and approval or disapproval of all changes to the established baseline configuration. It also includes the performance of those actions necessary to ensure that the actual configuration of a system completely matches its technical description in the approved engineering drawings, specifications, and related documents.

Characteristics – Any property or attribute of an item, process, or service that is distinct, describable, and measurable as conforming or nonconforming to specified quality requirements. Quality characteristics are generally identified in specifications and drawings, which describe the item, process, or service.

Configuration Management – A management method of producing an end result which comprises three elements: product identification, change control, and configuration accountability. Configuration management may be distributed throughout a number of organizational entities.

Conformance – An affirmative indication or judgment that an item has met the requirements of the relevant specifications or regulation.

Contractor – Any organization under contract for furnishing items or services. It includes the terms of but is not limited to architect, engineer, consultant, vendor, supplier, sub-consultant, and sub-tier levels of these organizations where appropriate.

Controlled Document – A document that is intended for limited, specified, and tracked distribution and which must be periodically reviewed and updated as required. The use and distribution of controlled documents are tracked and monitored under configuration control procedures.

DRAFT

Corrective Action – Documented commitment of a specific action planned or being implemented to resolve a known or identified condition or conditions adverse to quality.

Corrective Action Request – A document issued to the senior management of a group whose activities are not meeting requirements. This is a significant document that, in effect, warns the consultant/sub-consultants or others that continuing deficient activities will result in consideration of contract default.

Critical Preliminary Design Review – A design review that takes place prior to the issuance of the final preliminary design.

Deficiency – A minor deviation from the QAM and/or the QA/QC documents of the Columbia River Crossing project.

Design – Technical and management processes that create, fashion, execute, or construct documents according to a pre-determined plan or requirement.

DRAFT

Appendix I

TriMet Rail Fleet Management Plan

This page left blank intentionally.

Tri-County Metropolitan Transportation District of Oregon

Light Rail Transit
Fleet Management Plan

2009 - 2030

August 2008

Draft Update

Table of Contents

Cover photo: Type 4 LRV interior non-cab end at Ruby shop.

1) Introduction

This plan documents characteristics of the light rail fleet and maintenance facilities as well as the process of forecasting Tri-Met's future fleet requirements. Also, the report projects the fleet's spare ratio in the overall context of an operations and maintenance program that meets or exceeds rail transit industry best practices. Tri-Met has and will continue to update this document periodically to reflect emerging trends in such key areas as ridership, service policies, and system expansion.

This plan update also includes Tri-Met's light rail system extension projects that are either under construction or ready to enter Preliminary Engineering:

- **I-205/Portland Mall.** The I-205/Portland Mall MAX extension (Green Line) will run south from Gateway Transit Center, 6.7 miles, to Clackamas Town Center and along the Portland Mall in downtown Portland. The line, under construction since 2007 and scheduled to open in the Fall of 2009, initially requires 22 light rail vehicles (LRVs) to provide 10-minute peak hour headways. This will bring the MAX system's entire LRV fleet to 127 vehicles. The 10-minute peak hour headway will accommodate the forecast peak passenger loads through 201<u>8</u>. The planning horizon peak load forecast indicates that 30 LRVs will be required to provide Green Line service for the period from 201<u>9</u> to 2025; those 30 LRVs will allow 7.5-minute peak hour headways.

- **Milwaukie.** The Milwaukie extension will run from the south terminus of the Green and Yellow Lines on the Portland Mall 6.2 miles to a Lake Road terminus in Milwaukie or 7.3 miles to a Park Ave. terminus south of Milwaukie (both figures based on the Tillamook alignment option). The line, currently designated as the Orange Line and proposed to open in the Fall of 2015, will require 19 LRVs initially and 21 LRVs in 2030 for 7.5-minute peak hour and 15-minute mid-day headways.

- **Columbia River Crossing (CRC).** The CRC extension is planned to run 2.9 miles from the north terminus of the Yellow Line at Expo to Clark College in Vancouver, Washington. The extended Yellow Line, proposed to open in the Fall of 2016, initially requires 5 LRVs to provide 10-minute peak hour and 15-minute mid-day policy headways . The planning horizon peak load forecast indicates that 16 LRVs will be required to provide Yellow Line service in 2030 with 8-minute peak 2-hour headways.

Currently, Tri-Met has a fleet of 105 vehicles for its MAX (Metropolitan Area Express) light rail system. The fleet consists of 79 low floor cars and 26 high floor cars. A vehicle chronology follows:

- In 1986, a 26-vehicle fleet began serving passengers on a 15-mile line between Portland and Gresham.

- During 1997 and 1998, an additional 46 vehicles entered service in conjunction with an 18-mile system expansion to the West. These were North America's first low floor light rail vehicles.

- Prior to 1998 there were too few vehicles to keep pace with growing ridership. In response to these ridership trends and in consideration of the rare opportunity to purchase a small number of cars, TriMet's Board exercised an option (in the Westside vehicle contract) to purchase 6 additional vehicles put in service in 2000 and 2001.

- In 2000, 17 vehicles were ordered for the Interstate MAX, Yellow Line, opening.

- In 2002, 10 option vehicles were ordered for system ridership growth, 7 of those for Interstate MAX through 2020 as stated in the North Corridor FEIS.

- In 2006, 21 vehicles were ordered for the I-205/Portland Mall, Green Line, extension. An option for 1 more vehicle was exercised in 2008.

The 2006 order will bring the fleet up to 127 vehicles to accommodate Green Line service which begins in 2009. Two of the 22 new Green Line Type 4 vehicles are now on Tri-Met property undergoing acceptance testing.

The light rail operating and maintenance program reflects industry best practices. Maintenance is conducted at two modern facilities, one, Ruby Junction, 13 miles east of Portland and the other, Elmonica, 10 miles to the west of Portland. Rather than conduct major vehicle overhauls at mid-life or periodically, Tri-Met follows the practice of progressive overhauls by subsystem as indicated by failure rate analysis for each subsystem.

This plan differs from the previous, April 2006, Plan in the following ways:

1. Information about the proposed Milwaukie and CRC extensions has been added.

2. Service and ridership data has been updated to include 2007 in Figure 1 and Figure 8.

3. The Commuter Rail Line description has been updated.

4. Maintenance data has been updated in Section 7.

2) Definition of Terms

Capacity … achievable – The portion of design capacity that reflects uneven loading of cars in a train and uneven passenger arrivals at stations upstream of the peak load point during the peak hour. For MAX this is 80% of design capacity or an average of 133 passengers per vehicle (266 per 2-car train) during the peak hour that equates to a load factor of 2.08.

Capacity … design (AW2)– The total number of seated and standing people a vehicle is designed to accommodate with some comfort as opposed to no comfort (crush load). Design capacity equals 166 passengers per vehicle (332 per 2-car train) with standees at 4 per square meter.

Capacity … crush (AW3)– The total number of seated and standing people a vehicle is designed to accommodate with no comfort (crush load) with standees at 6 per square meter.

Capacity … structural design (AW4)– The maximum passenger capacity of a vehicle used for calculating maximum loaded vehicle weight for structural analysis, with standees at 8 per square meter.

Cycle time – The round trip travel time (run time in both directions) plus the layover times at both ends of the transit line.

Daybase train – A train that provides service most of the day and is in service generally between 16 and 20 hours per day.

Forecast – Future passenger demand based on a mathematical model.

Headway – The time interval between the passing of the front ends of trains moving along the same track in the same direction, usually expressed in minutes.

Life Cycle – The length of time that it is economic to operate a vehicle. For light rail vehicles this is usually between 25 and 36 years.

Load Factor – The number of passengers divided by the number of seats in a transit vehicle. A full-seated load has a load factor of 1.

MDBF – Mean Distance Between Failures

Overhaul – The disassembly, inspection, repair or replacement and reassembly of all vehicle systems. Mid-life overhauls usually occur half way through the vehicle's life cycle.

PVR - Peak Vehicle Requirement is the number of vehicles needed to meet the expected passenger demand at the peak load points during the peak hour in the peak direction during a typical weekday and provide at least daybase headways elsewhere in the MAX system.

Passenger demand – The number of passengers and the time of day they desire to travel.

Peak Tripper – A train that runs only during the peak periods to supplement the daybase trains when peak passenger demand is such that daybase trains alone cannot carry the loads. Trippers generally run from two to five hours at a time.

Progressive overhaul – The disassembly, inspection, repair or replacement and reassembly of only those vehicle systems that analysis of failure rates indicate is economically desirable.

Spare vehicle – Vehicles in the active fleet that are not needed during the peak periods for service and are therefore available for maintenance. If not scheduled for maintenance a spare can be used to replace a vehicle that fails in service.

Spare ratio – The number of spare vehicles divided by the PVR.

Runtime – The one-way travel time from one end of a transit line to the other end.

3) The Existing System

a) Tri-Met Overview

The Tri-County Metropolitan Transportation District of Oregon, Tri-Met, was established by the State Legislature in 1969 to provide mass transit service to the more populous parts of Multnomah, Washington, and Clackamas counties (the Portland metropolitan area). The governing body of Tri-Met is a seven member board of directors, who are unpaid citizen volunteers appointed to four year terms by the governor and confirmed by the Oregon Senate.

The Tri-Met district covers about 600 square miles containing approximately 1.2 million people. Tri-Met's services as of March 2008 consist of:

- 86 peak Light Rail Vehicles operating on 3 routes with 44 miles of right-of-way and 60 stations,
- 530 peak buses operating on 93 routes with over 8,000 stops and over 1,000 shelters,
- 18 bus / train interchange transit centers and 57 park and ride lots providing about 10,000 parking spaces.

The light rail system is referred to as MAX, for Metropolitan Area Express. The 33-mile long, east to west, Blue Line was opened in stages during 1986, 1997 and 1998. The 5.6-mile Airport Extension Project, the Red Line, opened for revenue service in September of 2001. The 5.8-mile Interstate Ave. Extension Project, the Yellow Line, opened for revenue service in May of 2004. Figure 1 is a map of the system as of 2007 and as proposed for 2009 and 2015.

Responsibility for the rail fleet is generally split between the Operations Division and the Capital Projects and Facilities Division. Responsibility for design, procurement, and testing predominately rests with systems engineers within the Capital Projects and Facilities Division. Operation and maintenance of the fleet is the responsibility of the Operations Division.

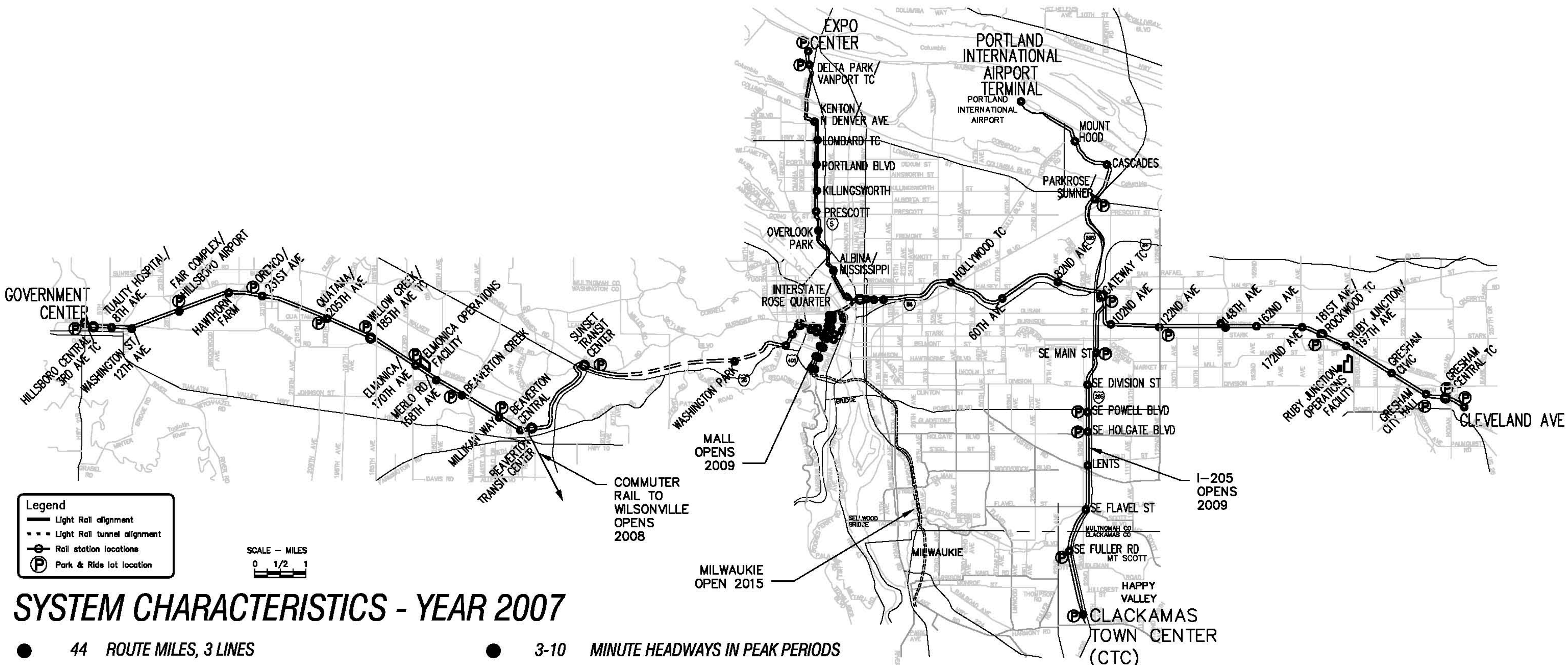
b) Light Rail Vehicles (LRV's)

The fleet consists of vehicles produced by two manufacturers: Bombardier and Siemens, referred to as Type 1 and Type 2 & 3, respectively. At the end of 2001 the fleet included 26 Type 1 vehicles and 52 Type 2 vehicles. The Interstate MAX project contract for 17 Type 3 vehicles resulted in these cars being available for service in 2004. All 17 were part of the active fleet by March 2004. Ten additional option vehicles, acquired through the Interstate MAX contract were available for service by Spring of 2005.

With the introduction of the Type 2 & 3, low floor vehicles, all two-car consists must include at least one Type 2 or 3 vehicle to insure accessibility for mobility devices. Type 1 vehicles cannot operate alone as the train would not be accessible to passengers requiring the use of mobility devices. Also, the system is designed to operate with trains of no more than two cars. (A two car train is roughly the length of one city block, thus when stopped at a platform cross-traffic can proceed unimpeded.)

FIGURE 1

TRI-MET LIGHT RAIL SYSTEM



SYSTEM CHARACTERISTICS - YEAR 2007

- 44 ROUTE MILES, 3 LINES
- 105 CARS IN FLEET (26 TYPE 1, 52 TYPE 2, 27 TYPE 3)
- 60 PASSENGER STATIONS, 107 PLATFORMS
- 3-10 MINUTE HEADWAYS IN PEAK PERIODS
- 42 TRAINS OPERATING IN PM PEAK PERIOD
- 106,000 DAILY PASSENGERS

I-205/MALL MAX EXTENSION - 2009

- 8.3 ADDED ROUTE MILES
- 15 PASSENGER STATIONS
- 10 MINUTE HEADWAYS IN PEAK HOUR TO CTC
- 24 NEW CARS IN FLEET FOR TOTAL OF 129
- 25,000 DAILY PASSENGERS (ESTIMATE)

MILWAUKIE MAX EXTENSION - 2015

- 6.5 ADDED ROUTE MILES
- 20,000 TO 25,000 DAILY PASSENGERS

Fleet Size Chronology

Ordered	Available	Increase	Fleet Size	Notes
1982	1986	26	26	Original Eastside Purchase, cars 101-126 all active
1993	1997	8	34	Piggy-back Eastside order with Westside contract, cars 201-208, all active
1993	1997	2	36	Favorable price allowed an increased order, cars 209 & 210, both active
1993	1998	29	65	Original Westside Order, cars 211-239, all active
1995	1998	7	72	Expansion to accommodate Hillsboro Extension, cars 240-246, all active
1997	2000	6	78	Option allowed increased order to meet system growth, cars 247-252, all active
2000	2003-4	17	95	Interstate (North) MAX Line Order, cars 301-317, delivery 2003
2002	2004-5	10	105	Option allowed increased order to meet 2020 fleet size of 24 for Interstate, cars 318-327, delivery 2004-5

i) Type 1 – Bombardier

The Bombardier vehicles were placed into service in September 1986. BN of Belgium designed the cars. Bombardier, the principal shareholder of BN, assembled Tri-Met's vehicles in Barre, Vermont. The cars are electrically propelled (DC drive) to a maximum design speed of 55 miles per hour, are constructed of corten steel, and have bi-directional operating capability. The cars seat 76 with a design capacity of 166 passengers with standees at 4 per square meter. A schematic of the Type 1 vehicle is shown in Figure 2.

ii) Type 2 and Type 3 – Siemens Duewag

The Siemens' vehicles entered service at various times between August 1997 and September 1998. Siemens Duewag of Germany designed the cars, with final assembly in Sacramento, California. They are designed with operator cabs at both ends to allow bi-directional operation. There is seating for 64 people and a design capacity of 166 passengers with standees at 4 per square meter. The 92-foot long cars are air-conditioned.

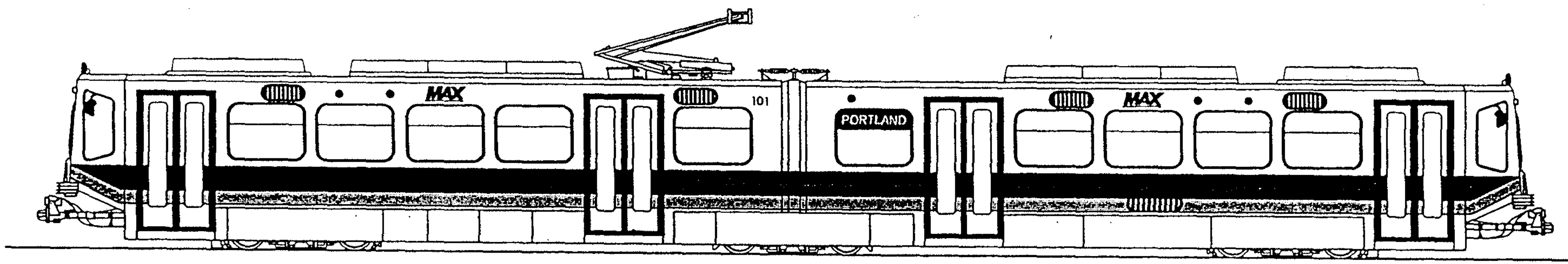
These are the first low floor light rail vehicles placed into service in North America. The cars are constructed of high tensile steel and designed for a top speed of 55 miles per hour with electric propulsion (AC drive). The cars are double articulated and can be operated in train sets of up to four, but are limited to two due to the length of MAX stations. These cars can be used in any combination of Type 1, Type 2 or Type 3 vehicles. Along with passenger/operator-activated bridgeplates on the center four doors, the low floor design allows full wheelchair access. The low floor section encompasses 70% of the vehicle, which is supported by a non-powered truck in the center articulation section. A schematic of the Type 2 and 3 vehicles is shown in Figure 3.

Type 3's are the same as Type 2's with the following additions:

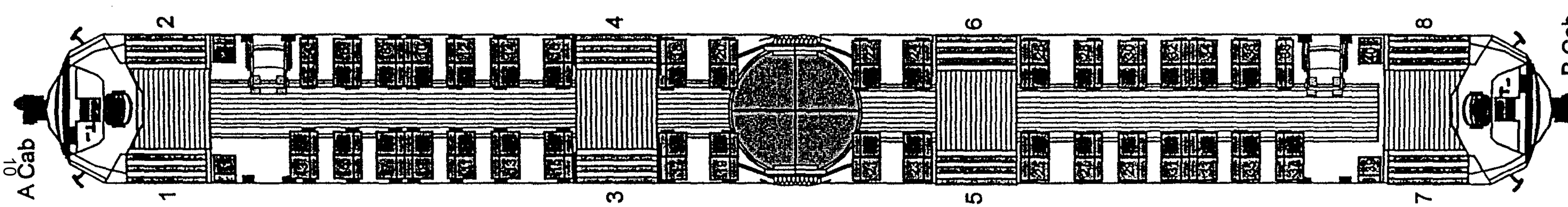
- Automatic passenger counters, APC's, for collecting better passenger load data for scheduling purposes
- Thermoking instead of Sutrak HVAC equipment.

FIGURE 2

TYPE 1



RIGHT SIDE



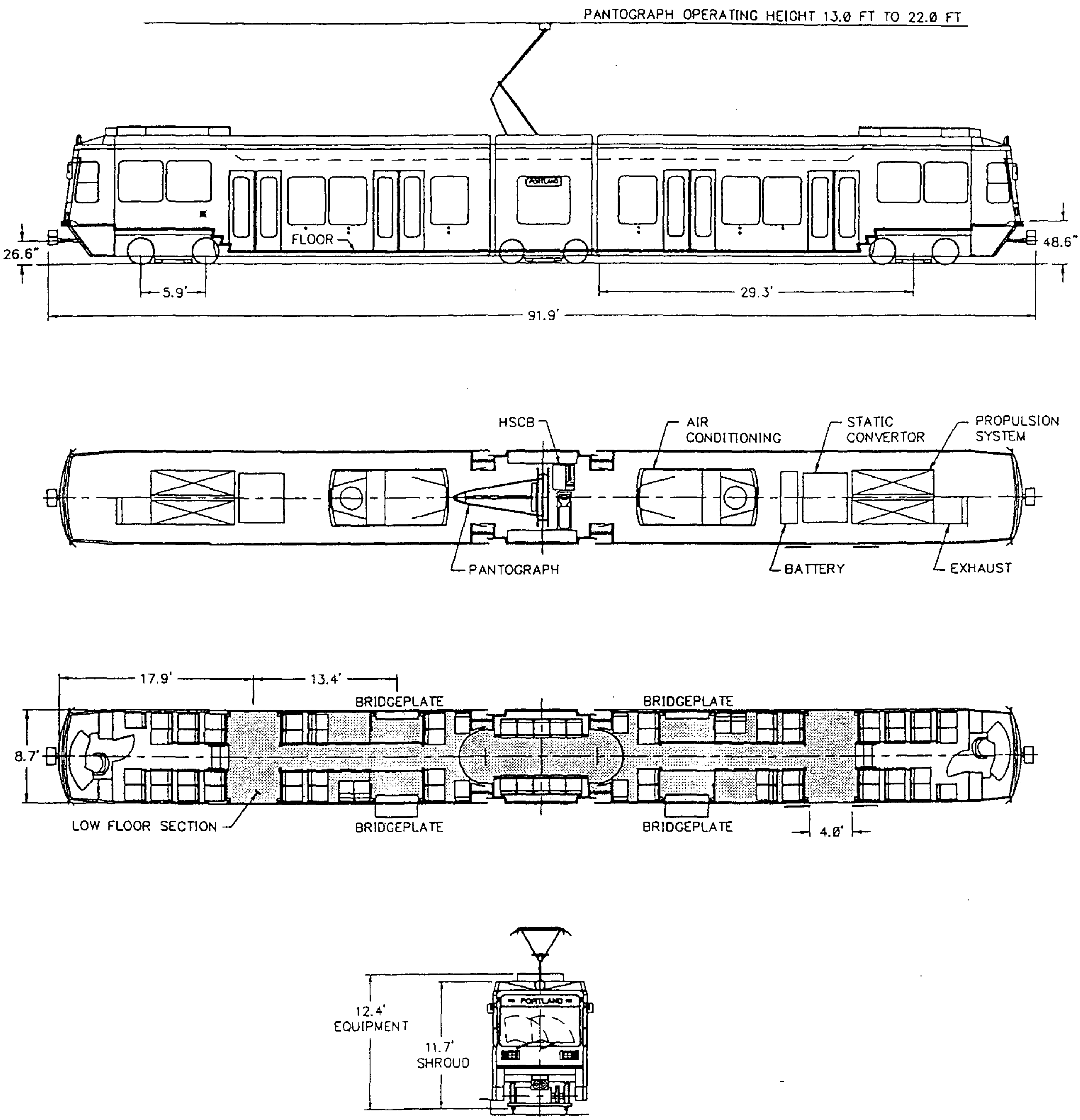


FIGURE 3

GENERAL ARRANGEMENT

c) Maintenance Facilities

TriMet's Rail Operations Department has two operations and maintenance facilities. Ruby Junction is located two miles west of the eastern terminus in Gresham and Elmonica located in Beaverton seven miles east of the western terminus in Hillsboro. The two facilities operate as a unit with most specialized functions, such as central train control and heavy maintenance work, occurring at Ruby Junction.

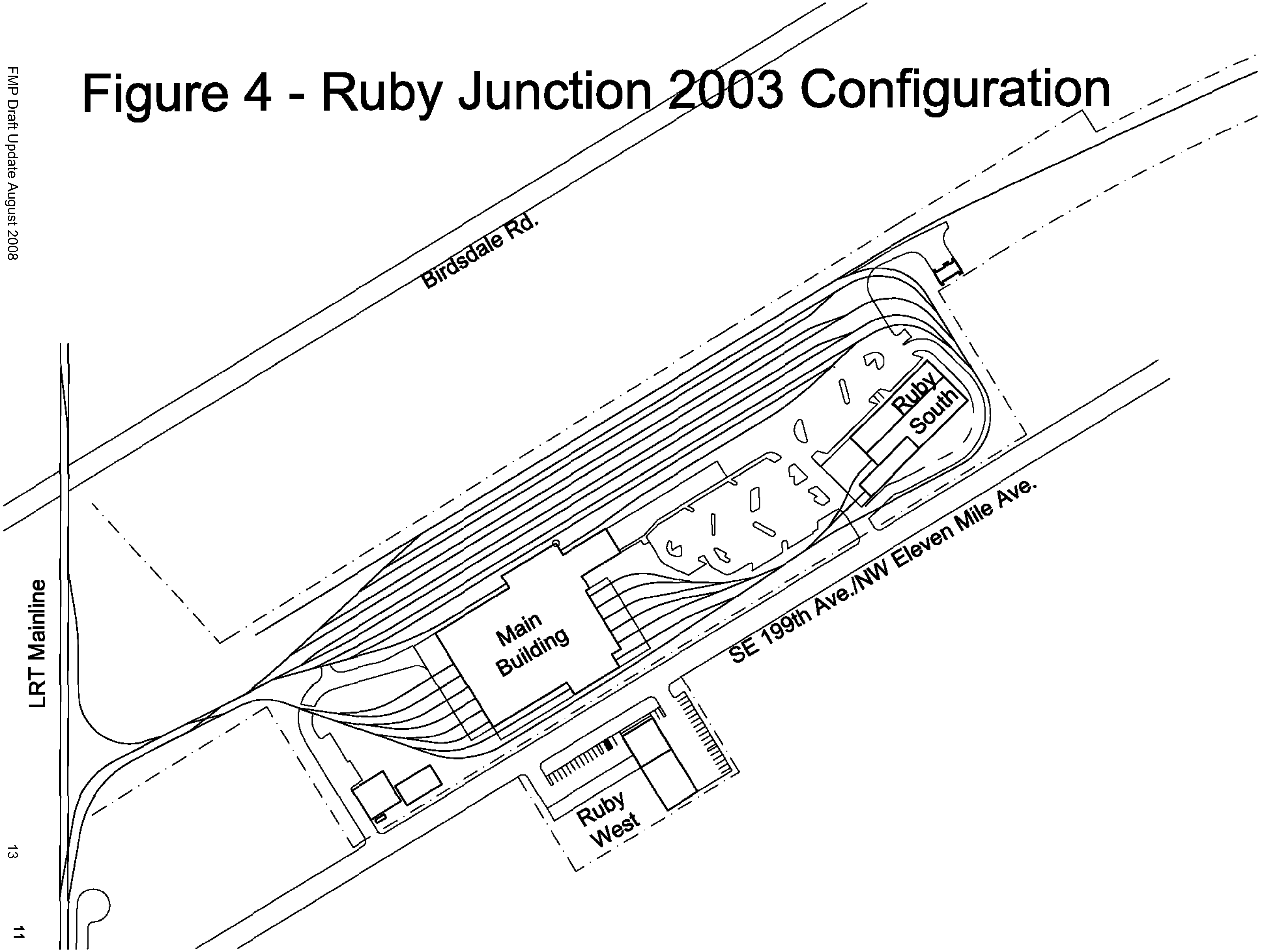
Ruby Junction

This facility, opened in 1985, houses Tri-Met's light rail vehicle maintenance department, rail central control, bus dispatch and offices for rail operations staff. During 1995, remodeling prepared the facility to service the new low floor vehicles as well as house a new system-wide communication and control center, based on a fiber optic network (SONET) and supervisory control and data acquisition (SCADA) technology. For the Interstate MAX extension, Yellow Line, that opened in 2004 new storage tracks were added and a new building, Ruby South was built to house Maintenance of Way (MOW) and a new LRV body shop and paint booth.

By 2004, the 17-acre facility (see Figure 4) included the following:

- Storage track for 67 vehicles
- Ruby Main, a 112,000 square foot three story shop, operations and administrative building with 11 maintenance bays excluding the wash bay and the 2nd bay on the wheel truing track, a truck shop and two sets of in floor jacks
- Ruby West, a 9,500 square foot non-revenue vehicle (support vehicles) servicing shop and storage area
- Ruby South a satellite building with a 21,000 square foot footprint, containing paint and body bays, one flat track bay for interior car work, a metal fabrication area, some body parts storage, a Maintenance-of–Way (MOW) shop and offices, restrooms, lockers and a lunch room to accommodate 60 workers over 3 shifts.
- 180 parking spaces
- A 6,700 square foot MOW shop and covered/open MOW storage

Figure 4 - Ruby Junction 2003 Configuration



Elmonica

This facility was constructed in conjunction with the Westside project. To allow for testing and storage of new vehicles, the construction contract for this facility was one of the first completed, opening in 1996. The design was based on existing facilities in Europe, where low floor cars are commonly used.

The 18-acre facility (see Figure 5) includes the following:

- Storage track for 48 vehicles
- A 70,000 square foot two story shop and operations building and 1,500 square foot storage building
- 8 maintenance bays excluding the wash bay and the 2nd bay on the wheel truing track (five with access to the rooftops)
- A seven and a half ton overhead crane
- 97 parking spaces

Storage Yard Size vs. Fleet Size

Since 1986 Tri-Met has had a surplus of storage yard spaces to accommodate fleet size increases due to ridership growth. The current surplus is 10 spaces. The current and projected surplus of storage spaces with the I-205 / Portland Mall South Corridor MAX Green Line extension in 2009, the proposed Milwaukie extension in 2015 and the proposed CRC extension in 2017 is shown in Table 1. The operations and maintenance facility improvements for the two phases of the South Corridor Project and the CRC Project are described in Section 4, System and Service Expansion.

Figure 5 - Elmonica 1996 Configuration

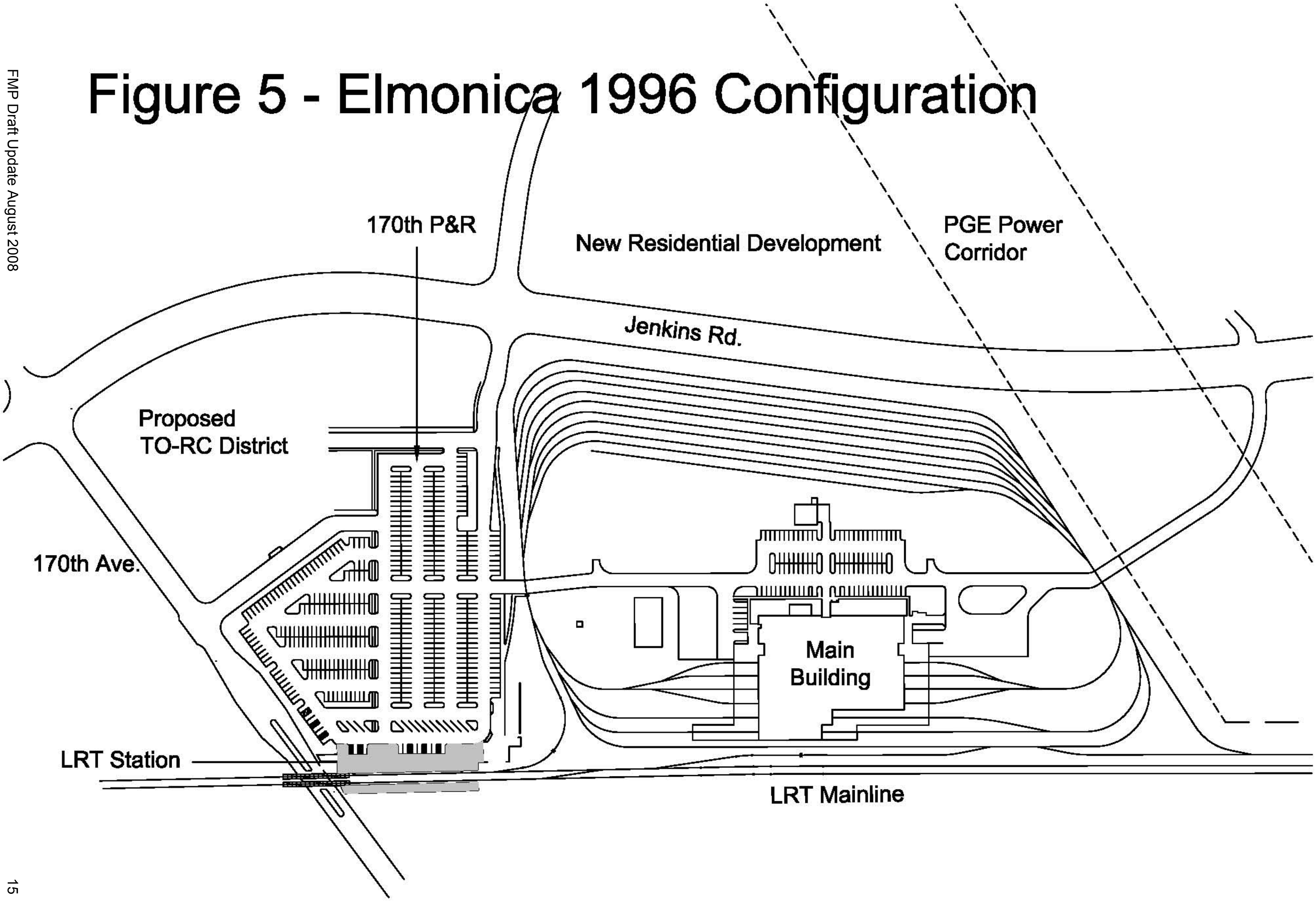


Table 1 Milwaukie
Storage Yard Space vs. Fleet Size

	2002	2004	2007	2009	2015	2016	2030
LRV Yard storage spaces							
Ruby Junction	48	48	67	67	67	94	**110**
Elmonica	42	42	42	48	53	53	**53**
Yellow Line additions							
at Ruby Junction		19					
at Elmonica			6				
Green Line additions							
at Elmonica				5			
at Ruby Junction					6		
Milwaukie additions							
at Ruby Junction					21		
CRC additions							
at Ruby Junction						16	
Total storage	**90**	**109**	**115**	**120**	**147**	**163**	**163**
Yellow Line fleet additions		24					
Green Line fleet additions				22	8		
Milwaukie fleet additions					21		
CRC fleet additions						16	
System Growth fleet additions		3					
Total fleet	**78**	**105**	**105**	**127**	**156**	**172**	**172**
Surplus	12	4	10	-7	-9	-9	-9

Notes:

The 2030 surplus of -9 is acceptable since some LRVs will be in repair bays and 8 can be stored on the test track at Ruby Junction, last in - first out.

The "Total fleet" does not include additional LRVs for system growth on existing lines after 2004 which are forecast to be up to 12 LRVs by 2035.

4) System and Service Expansion

a) South Corridor Light Rail Project Phases

Two light rail extensions were included in the alternatives studied in the South Corridor Supplementary Draft Environmental Impact Statement (SDEIS), Phase 1 south from Gateway Transit Center where the Blue and Red Lines merge westbound to Clackamas Town Center and Phase 2 south from the Portland CBD to Milwaukie.

Phase 1: I-205 / Portland Mall, Green Line Opens Fall 2009

The line south from Gateway Transit Center follows the I-205 highway alignment to Clackamas Town Center. The extension will operate to downtown Portland and share the right-of-way from Gateway to the Steel Bridge with other lines and then on a new downtown alignment, now under construction as part of the I-205/Mall project along the existing Transit Mall (5^{th} and 6^{th} Avenues), see Figure 6. It was estimated that a fleet of 24 and 30, Type 4, vehicles would be needed for this extension in 2009 and in 2025, respectively. The FEIS for this project was completed in the Fall of 2004.

Type 4 vehicles will not be backward compatible with the existing fleet in terms of the ability to trainline electrically with Type 1, 2 and 3 vehicles. Therefore, they will not be able to run coupled together as trains with the existing Type 1, 2 or 3 vehicles in revenue service, see Figure 7 for all 2-car train configurations. Type 4 vehicles will be mechanically compatible so that they may tow or be towed by an existing vehicle. Type 4 vehicles will be single-ended (have a control cab only at one end) which means they will be run as 12 two-car trains, since the ends of the existing and planned lines do not have loops. Single-ended cars were selected because they will have 5% greater passenger capacity. All vehicles will be capable of operating anywhere in the MAX system, so that the single-ended vehicles can be used where passenger loads and train congestion are greatest.

Operation and Maintenance Facility additions for the I-205/Mall fleet and for shifting Blue Line LRVs from Ruby to Elmonica to accommodate some of the new Green Line LRVs at Ruby will include:

- LRV Storage (for 2009 to 2018, assumes at least 1 car in Ruby Shop all night)
    - Gain 8 new spaces at Ruby by parking the last trains in and the first trains out on the existing test track. Extending the test track further south is deferred.
    - Add 5 new spaces at Elmonica by converting the non-powered MOW track to storage and building a new MOW track.
    - Use the 10 existing surplus spaces; see the 2007 column in Table 1.

- Maintenance Bays (for 2009 to 2018)
    - Add one pit & platform bay to Ruby on northeast corner of the building.
    - Add one pit & platform bay to Elmonica east of the blow down bay.
    - Add an overhead platform to the bay east of the wheel-truing machine at Elmonica.
    - Enlarge the pit in the blow down bay at Elmonica to allow more tasks to be done there.

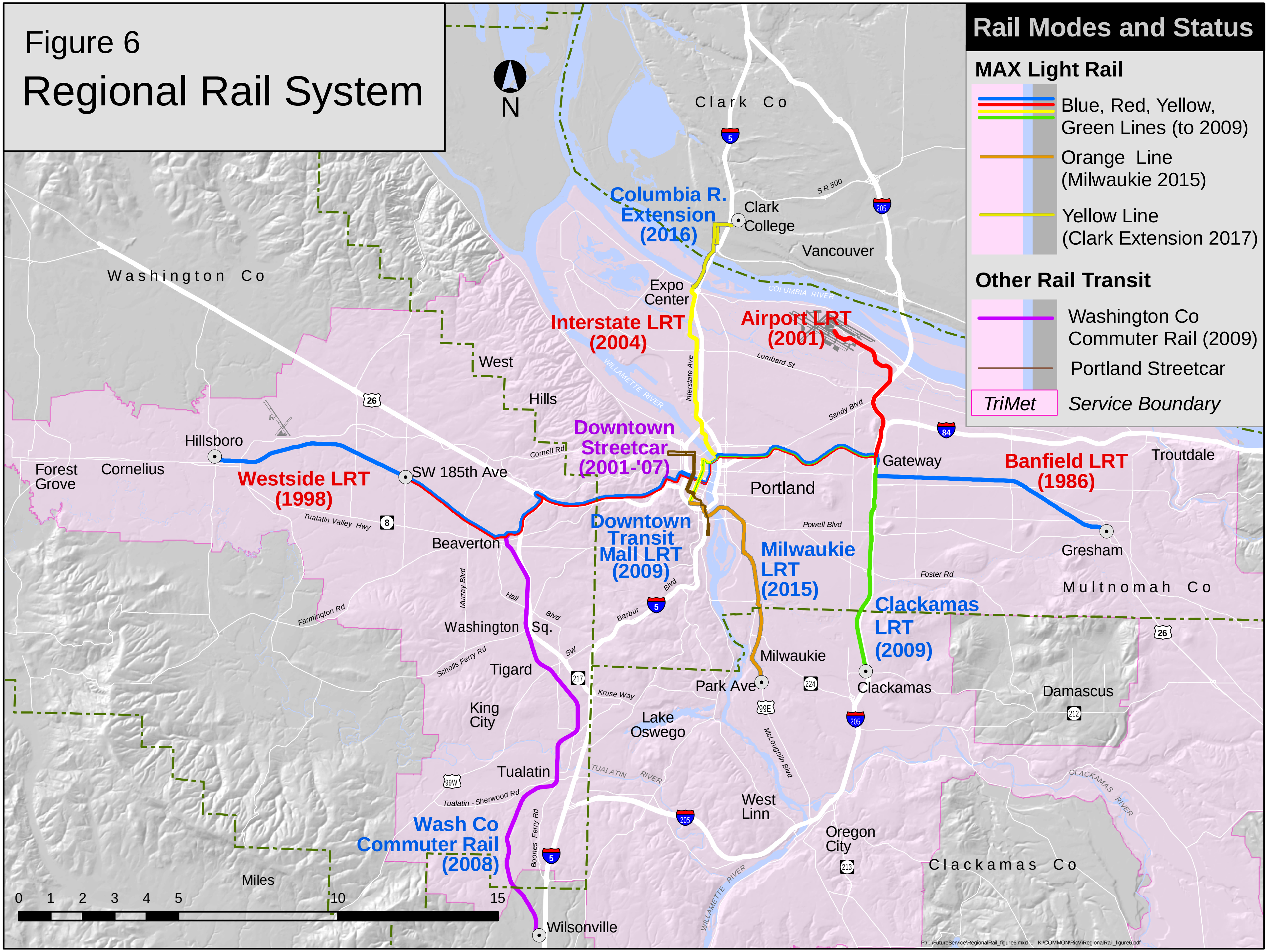
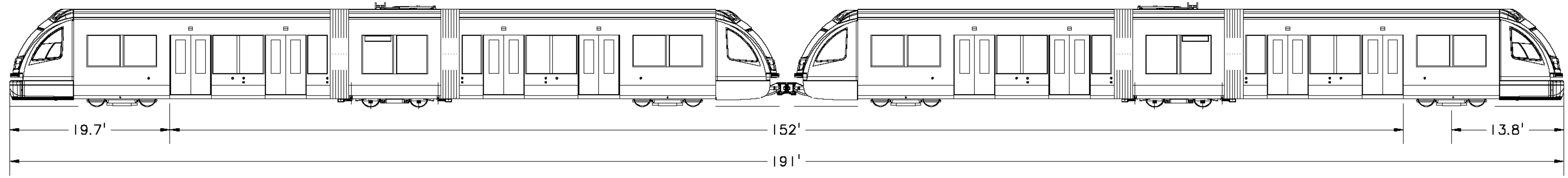
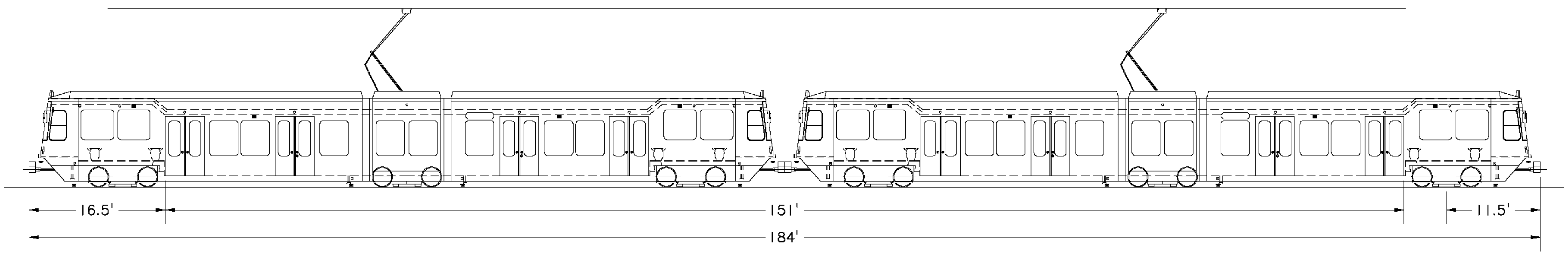


Figure 6
Regional Rail System

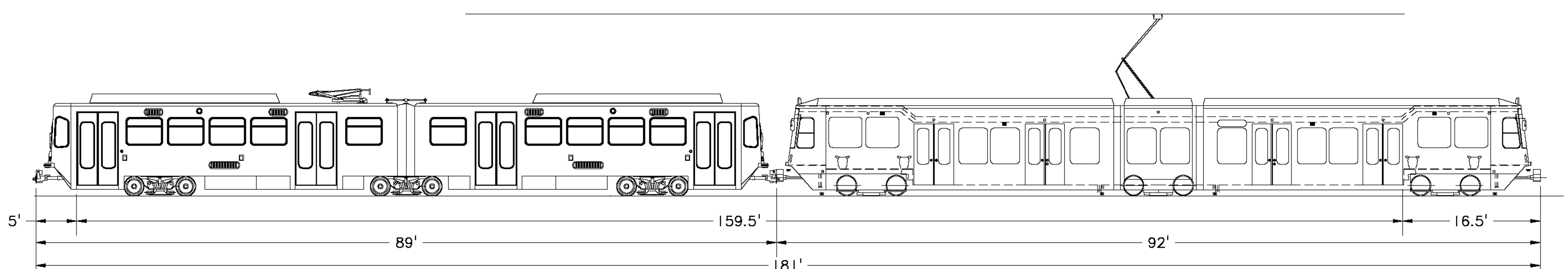
FMP Draft Update August 2008



TYPE 4 2-CAR TRAIN



TYPE 2 OR 3 2-CAR TRAIN



TYPE 1/TYPE 2 OR 3 2-CAR TRAIN

NO.	DATE	BY CHK.	APPD.	REVISIONS

DESIGNED: JG — DATE: 01/07
DRAWN: JHM — DATE: 01/07
CHECKED — DATE
APPROVED — DATE

TRI-COUNTY METROPOLITAN TRANSPORTATION DISTRICT OF OREGON

TRI MET
CAPITAL PROJECTS AND FACILITIES DIVISION
710 N.E. HOLLADAY STREET
PORTLAND, OREGON 97232

SUBMITTED: — DATE: — APPROVED: — DATE:

FIGURE 7
REVENUE SERVICE 2-CAR CONFIGURATIONS

SCALE: NOT TO SCALE — DRAWING NO.: LRV-T4-T3-T1 — CONTRACT NO.: — SHEET NO.:

S:\Work\Lib-TEMP\MAX\LRV-T4-T3-T1.dwg, 1/25/2007 12:58:25 PM, lortsb

- Rail Control Improvements (for 2009 to 2025)
    - Expanded overview display
    - Mall bus and rail console with CBD display board

- Spare Parts Storage Building at Elmonica (for 2009 to 2025)
    - Build a spare parts storage building inside the track loop to move MOW materials out of the main building to allow for material storage, maintenance and operation of some Green Line trains out of Elmonica and the Blue Line trains transferred from Ruby Junction. The MOW shop and offices previously planned to also be in this building are deferred. Planning is under way to find a central location near the Steel Bridge for an MOW and Facilities Maintenance base to serve the Mall, central area and the Yellow Line.

Phase 2: Milwaukie, Orange Line Opens 2015

The second phase of the South Corridor Project will extend light rail south from Downtown Portland to south of downtown Milwaukie at Park Ave., see Figure 6. The extension will either operate as a through route with the North Corridor's Yellow Line, Interstate Ave. MAX or terminate at Union Station at the north end of the Mall. Revenue service on the Milwaukie extension is planned to begin in about 2015. It was estimated that a fleet of 21, Type 5, vehicles would be needed for this extension in 2030.

Type 5 vehicles will be compatible with Type 4 vehicles but not electrically compatible with Type 1, 2 and 3 vehicles. Therefore, they will not be able to run coupled together as trains with Type 1, 2 or 3 vehicles in revenue service. Type 5 vehicles may be single-ended like the Type 4 vehicles or they may be double ended for greater flexibility in service, depending on a review of the performance of Type 4 vehicles in the first few years of service.

Operation and Maintenance Facility additions for the Milwaukie fleet at Ruby Junction will include:

- LRV Storage for 2030
    - Add 21 new spaces at Ruby Junction on about 10 acres of land acquired with project funds.

- Maintenance Bays for 2030
    - Relocate the wash bay to make room for added maintenance bays.
    - Add between 2 to 6 pit & platform bays on the west side of the main shop.

- Rail Control Improvements for 2030
    - Build a new operations command center at Ruby or on a more central TriMet site to accommodate control room expansion, redundant equipment for reliability in emergencies and an overview display greater than one story in height for acceptable readability.

b) Columbia River Crossing (CRC) Opens 2016

The Columbia River Crossing (CRC) project will extend the Yellow Line north from the Exposition Center station in Portland to Clark College in Vancouver, Washington, see Figure 6. Revenue service on the CRC extension is planned to begin in 2016. It was estimated that a fleet of 16, Type 5, vehicles would be needed for this extension in 2030.

Type 5 vehicles will be compatible with Type 4 vehicles but not electrically compatible with Type 1, 2 and 3 vehicles. Therefore, they will not be able to run coupled together as trains with Type 1, 2 or 3 vehicles in revenue service. Type 5 vehicles may be single-ended like the Type 4 vehicles or they may be double ended for greater flexibility in service, depending on a review of the performance of Type 4 vehicles in the first few years of service.

Operation and Maintenance Facility additions for the Milwaukie fleet at Ruby Junction will include:

- LRV Storage for 2030
    - Add 16 new spaces at Ruby Junction on the same 10 acres of land acquired for the Milwaukie project.

- Maintenance Bays for 2030
    - Finish the pit & platform bays on the west side of the main shop.

- Rail Control Improvements for 2030
    - Finish the new operations command center at Ruby or on a more central TriMet site to accommodate control room expansion, redundant equipment for reliability in emergencies and an overview display greater than one story in height for acceptable readability.

c) Washington County Commuter Rail Project, WES Opens Fall 2009

Wilsonville to Beaverton Commuter Rail will serve the heavily traveled Interstate 5 and Highway 217 corridor and connect with two TriMet MAX light rail lines, the Red Line and the Blue Line at the Beaverton Transit Center. The proposed 14.7-mile project will travel between Beaverton Transit Center and Wilsonville, and also serve the communities of Tigard and Tualatin. Commuter Rail will share freight tracks with the Portland & Western Railroad in eastern Washington County.

The project includes five stations, with park & ride spaces at four stations:

- Beaverton Transit Center – bus and MAX transfers
- Washington Square – bus transfers, park & ride
- Tigard Transit Center – bus transfers, park & ride
- Tualatin – bus transfers, park & ride
- Wilsonville - bus transfers, park & ride

Currently under construction, Commuter Rail is scheduled to open in 2009 and operate weekdays every 30 minutes during morning and afternoon peak periods. Travel time will be approximately 27 minutes between Beaverton Transit Center and Wilsonville. Trains will travel at an average of 37 miles per hour, with a top speed of 60 miles per hour. Average daily ridership is forecast at between 3,000 and 4,000 daily riders by 2020.

This commuter rail line will be called the Westside Express Service (WES) and is shown on the Rail system schematic drawing in Figure 6.

5) Demand for Revenue Vehicles

a. Passenger Demand

Weekday Boardings. In May of 2004 the MAX system evolved from a 2-route to a 3-route system. The three routes are identified by colors: the Yellow Line for the north corridor service, the Red Line for Airport to Beaverton service via Downtown Portland and the Blue Line for Gresham to Hillsboro service via Downtown Portland. All three lines share the same right-of-way and tracks between Rose Quarter and the SW 11th Ave. terminal in Downtown Portland.

Between 2000 and 2006 (inclusive) average weekday ridership on the MAX system grew at an average annual growth rate of almost 7%. In June, the highest month in 2007, the MAX system averaged 113,900 weekday boardings. The Blue Line's highest average weekday boardings, 74,500, occurred just before the Red Line opened in September of 2001. The Red Line's highest average weekday boardings, 29,400 occurred in June of 2007, while the recently opened Interstate MAX Extension (Yellow Line) reached a high of 14,400 in May of 2008. The effect of additional ridership due to system expansion and ridership growth is compared to fleet size in Figure 8.

Peak Hour Loads. The Blue and Red Lines have two peak load points: Lloyd Center east of downtown and Goose Hollow (SE18th & Jefferson) west of downtown. The Yellow Line's peak load point is just north of Rose Quarter before it shares the right-of–way with the Blue and Red Lines over the Steel Bridge and into downtown.

Historical and future forecasted volumes are shown in Tables 2A and 2B. Historical volumes are the average of one week's worth of manual counts taken each Fall and automatic passenger counter samples collected every weekday on Type 3 LRVs in the Fall of 2004, 2005, 2006 and 2007. The forecasted volumes for 2009, 2016 and 2030 are outputs from the regional EMME2 travel demand model. These outputs are from more than one model run, 2010 is from the runs for the I-205 / Mall FEIS and 2016 is from the runs made for the Milwaukie SDEIS. 2030 volumes are from the individual runs made for both Milwaukie and CRC. The only combined Milwaukie / CRC run was made for the Regional Transprtation Plan (RTP) for 2035. Tables 2A and 2B do not include additional LRVs for system passenger growth on the Blue, Red and Yellow Lines, but does indicate when achievable capacity is exceeded and additional LRVs to sustain ridership growth will be needed.

The peak hour light rail loads in Tables 2A and 2B include transfers to and from Commuter Rail at Beaverton Transit Center. With Red Line trains starting their runs eastbound every 15 minutes, commuter rail passengers transferring to head downtown will be able to get a seat by waiting an average of 7 and one half minutes if they choose not to board a Blue Line train.

Figure 8
Weekday Ridership Growth vs. LRV Fleet Size

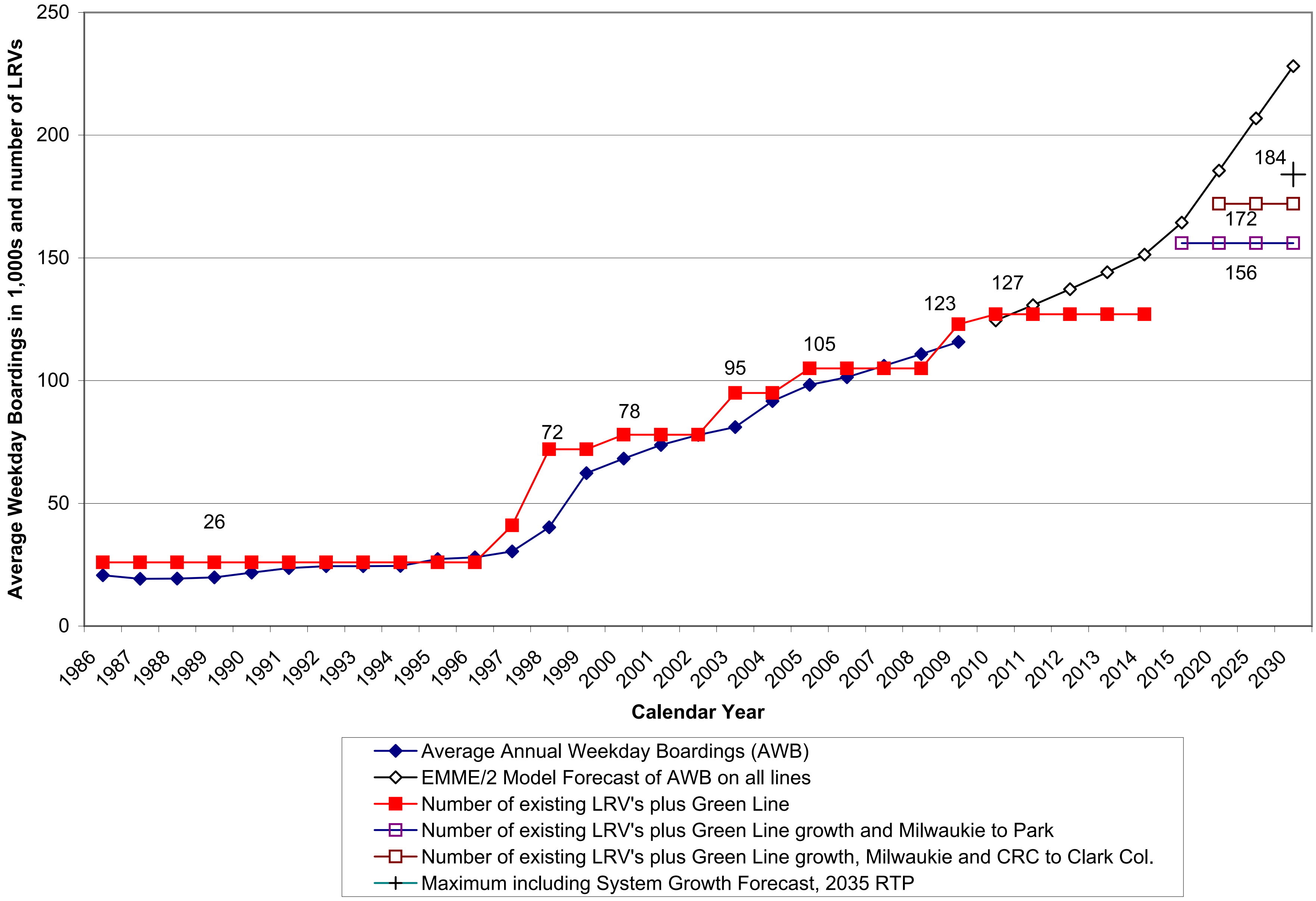


TABLE 2A for Milwaukie extension only
Percent of Achievable Capacity and Load Factor

	Historical					Forecasts		
	2003	**2004**	**2005**	**2006**	**2007**	**2010**	**2016**	**2030**
Blue Line (East & West)	60	60	48	48	48	50	50	50
Red Line (Airport east & BTC west)	9	9	18	18	19	24	24	24
Yellow Line (Interstate north)		14	10	11	12	13	16	16
Orange Line (Milwaukie south)							18	18
Green Line (I-205 south)						18	26	26
Mall Shuttle						1	1	1
Gap Trains						4	2	2
Peak Vehicle Requirement (PVR)	69	83	76	77	79	110	137	137
Active Fleet	82	94 to 105	105	103	103	127	156	156
Total Fleet	82	95 to 105	105	105	105	127	156	156
Spare Ratio (Active fleet -PVR)/PVR	19%	14% to 27%	38%	34%	30%	15%	14%	14%
PM PEAK HOUR AT THE EAST PEAK LOAD POINT (7th/Lloyd Center) IN THE PEAK DIRECTION (Blue, Red & Green Lines)								
Volume OB all Lines	1,795	1,995	1,961	1,997	2,004	3,250	4,294	5,428
Volume OB Blue Line	1,415	1,645	1,438	1,513	1,471	2,030	2,108	2,603
Volume OB Red Line	380	350	523	484	533	350	440	528
Volume OB Green Line						870	1,746	2,297
Number of LRV's all Lines	22	22	24	24	24	38	44	44
Blue Line (East & West)	18	18	16	16	16	18	18	18
Red Line (Airport)	4	4	8	8	8	8	8	8
Green Line (I-205 south)						12	18	18
% of Achievable Capacity all Lines	**61%**	**68%**	**61%**	**63%**	**63%**	**64%**	**73%**	**93%**
Load Factor on all Lines	**1.3**	**1.4**	**1.3**	**1.3**	**1.3**	**1.3**	**1.5**	**1.9**
% of Achievable Capacity on Blue Line	59%	69%	68%	71%	69%	85%	88%	109%
% of Achievable Capacity on Red Line	71%	66%	49%	45%	50%	33%	41%	50%
PM PEAK HOUR AT THE WEST PEAK LOAD POINT (Goose Hollow) IN THE PEAK DIRECTION (Blue & Red Lines)								
Volume OB both Lines	1,686	1,718	1,763	1,689	1,757	2,460	3,207	3,726
Volume OB Blue Line	1,364	1,477	1,402	1,280	1,329	2,180	2,824	3,239
Volume OB Red Line	322	241	361	409	428	280	383	487
Number of LRV's both Lines	22	24	24	24	24	30	30	30
Blue Line (East & West)	18	20	16	16	16	22	22	22
Red Line (Airport)	4	4	8	8	8	8	8	8
% of Achievable Capacity both Lines	**58%**	**54%**	**55%**	**53%**	**55%**	**62%**	**80%**	**93%**
Load Factor on both Lines	**1.2**	**1.1**	**1.1**	**1.1**	**1.1**	**1.3**	**1.7**	**1.9**
% of Achievable Capacity Blue Line	57%	56%	66%	60%	62%	75%	97%	111%
% of Achievable Capacity Red Line	61%	45%	34%	38%	40%	26%	36%	46%
PM PEAK HOUR AT THE NORTH PEAK LOAD POINT (Rose Quarter) IN THE PEAK DIRECTION (Yellow Line)								
Volume OB Yellow Line		449	472	539	607	570	570	739
Number of LRV's		10	8	9	10	10	12	12
% of Achievable Capacity		**34%**	**44%**	**45%**	**46%**	**43%**	**36%**	**46%**
Load Factor		**0.7**	**0.9**	**0.9**	**0.9**	**0.9**	**0.7**	**1.0**
PM PEAK HOUR AT THE SOUTH PEAK LOAD POINT (Gateway TC) IN THE PEAK DIRECTION (Green Line)								
Volume OB Green Line						920	1,620	2,176
Number of LRV's						12	18	18
% of Achievable Capacity						**58%**	**68%**	**91%**
Load Factor						**1.2**	**1.4**	**1.9**
PM PEAK HOUR AT THE SOUTH PEAK LOAD POINT (OMSI) IN THE PEAK DIRECTION (Orange Line)								
Volume OB Orange Line							1,719	2,092
Number of LRV's							16	16
% of Achievable Capacity							**81%**	**98%**
Load Factor							**1.7**	**2.0**

Notes:

The Red Line is proposed to be extended west 6 stations in 2010, this was not included in the demand modeling which assumes more frequent Blue Line service.

Single-car trains are Type 2 or 3 LRV's with 64 seats. Two-car trains can have one Type 1 car that has 76 seats.

Shaded cells exceed 99% of achievable capacity, indicating that a train or second car should be added to sustain passenger growth.

In 2004-5 the fleet size was 95 at the start of the year and 105 at the end of the year.

2000 to 2003 peak hour volumes, from manual counts conducted 1 week each Fall, are the peak hour sums of average train loads.

2004-6 peak hour volumes, from Fall automatic passenger counter (APC) samples, are the peak hour sums of average train loads.

Individual train loads can vary considerably from the average, especially if a train is several minutes late, affecting it and its follower.

7/29/2008

TABLE 2B for CRC extension only
Percent of Achievable Capacity and Load Factor

	Historical					Forecast		
Starting	**2003**	**2004**	**2005**	**2006**	**2007**	**2010**	**2017**	**2030**
Peak Vehical Requirement (PVR)								
Blue Line (East & West)	60	60	48	48	48	50	50	50
Red Line (Airport)	9	9	18	18	19	24	24	24
Yellow Line (North)		14	10	11	12	13	30	30
Orange Line (South)								
Green Line (I-205 south)						18	26	26
Mall Shuttle						1	1	1
Gap Trains						4	2	2
Total PVR	69	83	76	77	79	110	133	133
Total Fleet (includes 2 inactive 06-09)	82	95 to 105	105	105	105	127	151	151
Spare Ratio (spares/PVR)	19%	14% to 27%	38%	36%	33%	15%	14%	14%
PM PEAK HOUR AT THE EAST PEAK LOAD POINT (7th/Lloyd Center) IN THE PEAK DIRECTION (Blue, Red & Green Lines)								
Volume OB all Lines	1,795	1,995	1,961	1,997	2,004	3,250	4,155	5,335
Volume OB Blue Line	1,415	1,645	1,438	1,513	1,471	2,030	2,032	2,526
Volume OB Red Line	380	350	523	484	533	350	395	503
Volume OB Green Line						870	1,728	2,306
Number of LRV's all Lines	22	22	24	24	24	38	44	44
Blue Line (East & West)	18	18	16	16	16	18	18	18
Red Line (Airport)	4	4	8	8	8	8	8	8
Green Line (I-205 south)						12	18	18
% of Achievable Capacity all Lines	61%	68%	61%	63%		64%	71%	91%
Load Factor on all Lines	1.3	1.4	1.3	1.3		1.3	1.5	1.9
% of Achievable Capacity on Blue Line	59%	69%	68%	71%		85%	85%	106%
% of Achievable Capacity on Red Line	71%	66%	49%	45%		33%	37%	47%
PM PEAK HOUR AT THE WEST PEAK LOAD POINT (Goose Hollow) IN THE PEAK DIRECTION (Blue & Red Lines)								
Volume OB both Lines	1,686	1,718	1,763	1,689	1,757	2,460	3,308	3,695
Volume OB Blue Line	1,364	1,477	1,402	1,280	1,329	2,180	2,848	3,115
Volume OB Red Line	322	241	361	409	428	280	460	580
Number of LRV's both Lines	22	24	24	24	24	30	30	30
Blue Line (East & West)	18	20	16	16	16	22	22	22
Red Line (Airport)	4	4	8	8	8	8	8	8
% of Achievable Capacity both Lines	58%	54%	55%	53%	55%	62%	83%	93%
Load Factor on both Lines	1.2	1.1	1.1	1.1	1.1	1.3	1.7	1.9
% of Achievable Capacity Blue Line	57%	56%	66%	60%	62%	75%	97%	106%
% of Achievable Capacity Red Line	61%	45%	34%	38%	40%	26%	43%	55%
PM PEAK HOUR AT THE NORTH PEAK LOAD POINT (Rose Quarter) IN THE PEAK DIRECTION (Yellow Line)								
Volume OB Yellow Line		449	472	539	607	570	1,527	2,428
Number of LRV's		10	8	9	10	10	20	20
% of Achievable Capacity		34%	44%	45%	46%	43%	57%	91%
Load Factor		0.7	0.9	0.9	0.9	0.9	1.2	1.9
PM PEAK HOUR AT THE SOUTH PEAK LOAD POINT (Gateway TC) IN THE PEAK DIRECTION (Green Line)								
Volume OB Green Line						920	1,728	2,306
Number of LRV's						12	18	18
% of Achievable Capacity						58%	72%	96%
Load Factor						1.2	1.5	2.0

Notes:

The Red Line is proposed to be extended west 6 stations in 2010, this was not included in the demand modeling which assumes more frequent Blue Line service.

Single-car trains are Type 2 or 3 LRV's with 64 seats. Two-car trains can have one Type 1 car that has 76 seats.

Shaded cells exceed 99% of achievable capacity, indicating that a train or second car should be added to sustain passenger growth

In 2004-5 the fleet size was 95 at the start of the year and 105 at the end of the year.

2003 peak hour volumes, from manual counts conducted 1 week each Fall, are the peak hour sums of average train loads.

2004-7 volumes, from Fall automatic passenger counter (APC) samples, 4:30 to 5:29 PM, each load point could differ and be

Individual train loads can vary considerably from the average, especially if a train is several minutes late, affecting it and its

b. MAX Service Standards (Train Loading)

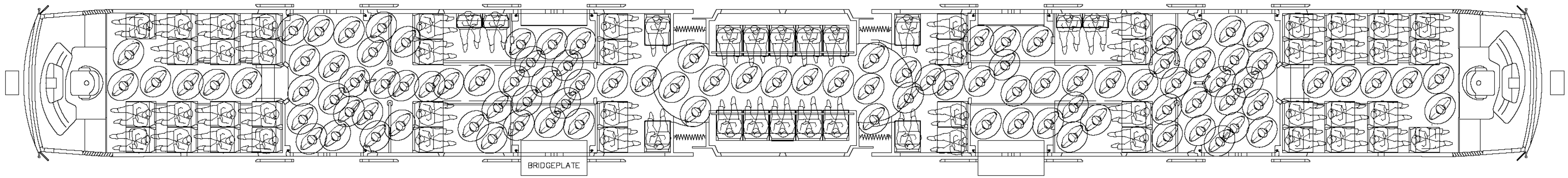
In 1989, The Tri-Met Board of Directors adopted Service Standards for the design, evaluation and adjustment of transit service. The Service Standards do not apply to individual train trips but to average vehicle loads during each time period. This Service Standards document established the operating policies for headways as well as passenger loads. Headway is the time interval between train arrivals at stations. The minimum policy headways for light rail are:

- 10 minutes in the peak (7-9AM & 4-6PM)
- 15 minutes in the daybase (6-7AM & 9-4PM)
- 15 minutes in the evening (6-9:30PM)
- 30 minutes at night (9:30 PM -12 midnight)

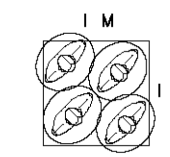
The peak policy headway does not apply to the Red Line that averages 15-minute headways nearly the entire service day, seven days a week. This near uniform headway is a result of the line's more even demand levels due to a lower percentage of commuters and the bi-directional nature of travel patterns on the line during peak periods.

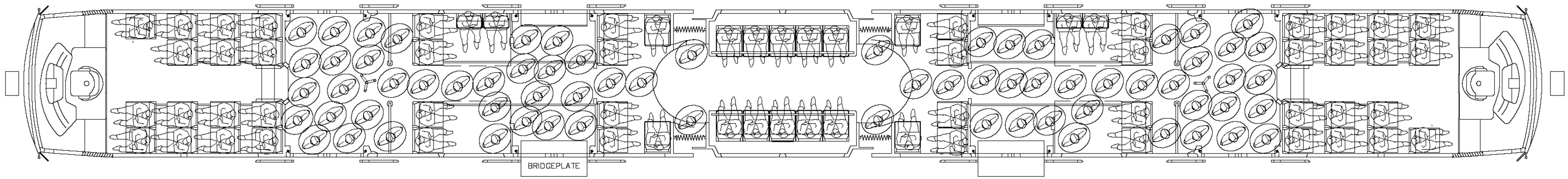
Achievable capacity is the total number of passengers that will crowd onto every train during the peak hour. The first eighteen years of operating experience taught Tri-Met that, in Portland, rider's crowding threshold is an average of 266 people per 2-car train during the peak hour in the peak direction. While some trains do carry the design load of 332 or more riders, the average during the peak hour is 266, see Figure 9. The 266 figure allows for some ridership growth and is further supported by FTA sponsored research by the TRB which states that average achievable capacity per train for Light Rail over the peak one hour in the peak direction equals 75% (249) of the design capacity (332), see Appendix A.

The percentage of achievable capacity without new vehicles for existing system growth at the peak load points is shown in Tables 2A and 2B. In Table 2A for example the Eastside percentages start at 61% (a 1.3 load factor) in 2003 and end at a projected 93% average for all lines. For the Blue Line only 109% is projected in 2030. Westside percentages start at 58% (a 1.2 load factor) in 2003 and end at a projected 93% average and a projected 111% Blue Line load in 2030. The travel demand model assigns trips between the Blue and Red Lines based on frequency. In reality crowding also affects each passenger's decision on which train to board if both lines serve their destination. North corridor percentages start at 34% (a 0.7 load factor) in 2004 and end at a forecasted 46% in 2030, however the 2010 forecast is below the 2007 actual load. I-205 / Mall percentages are forecast to be 58% (a 1.2 load factor) at start-up, 91% (a 1.9 load factor) in 2030. Milwaukie is forecast to be at 92% (a 1.9 load factor) in 2016 and 98% (a 2.0 load factor) in 2030. Peak hour load factor values by year for each peak load point are shown in Figure 10 based on 2025 Blue, Red and Green Line data and 2030 Milwaukie/CRC data; see Section e, Peak Vehicle Requirements.

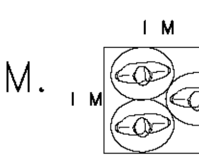


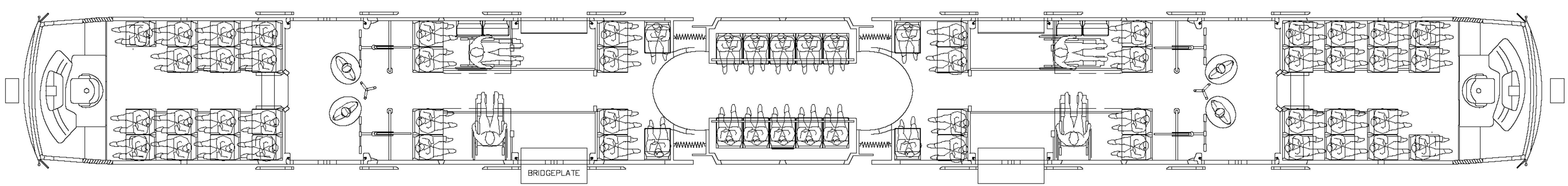
DESIGN CAPACITY 166 = 64 SEATED + 102 STANDING AT 4 PER SQ. M.





ACHIEVABLE CAPACITY AVERAGE LOAD DURING PEAK HOUR 133 = 64 SEATED + 69 STANDING AT 2.7 PER SQ. M.





60 SEATED, 4 BICYCLES, 4 WHEELCHAIRS

FMP Draft Update August 2008

NO.	DATE	BY CHK.	APPD.	REVISIONS

DESIGNED JHM DATE 12/01
DRAWN DATE
CHECKED DATE
APPROVED DATE

TRI-COUNTY METROPOLITAN TRANSPORTATION DISTRICT OF OREGON

TRI MET
CAPITAL PROJECTS AND FACILITIES DIVISION
710 N.E. HOLLADAY STREET
PORTLAND, OREGON 97232

SUBMITTED: DATE: APPROVED: DATE:

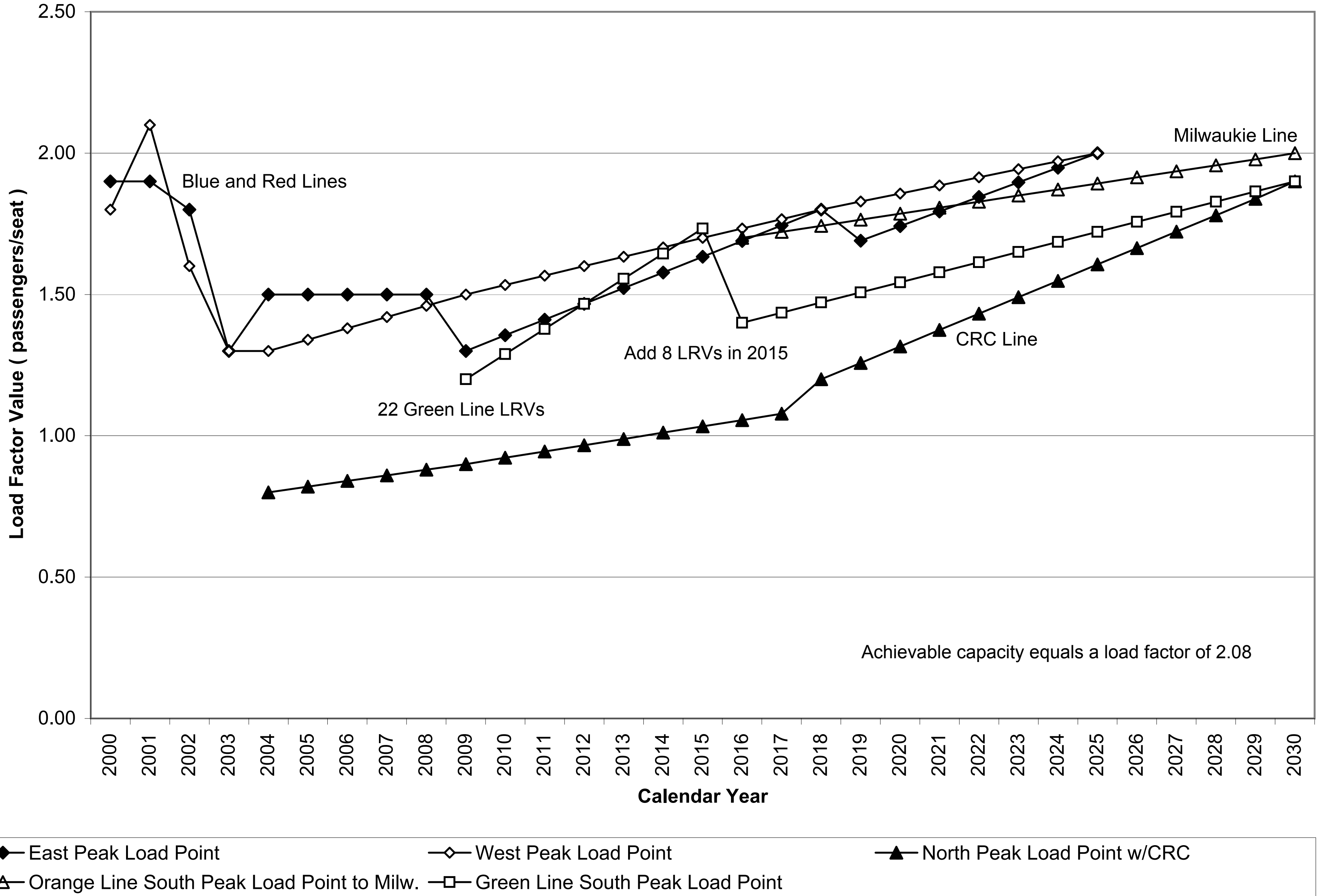
FIGURE 9
LOW FLOOR LIGHT RAIL VEHICLE
CAPACITY

28

SCALE: NONE | DRAWING NO.: LFLRVCAP | CONTRACT NO.: | SHEET NO.: 21

R:\CAD_Admin\John\LFLRVCAP.dwg, 1/25/2007 12:59:13 PM, lortsb
R:\CAD_ADMIN\JOHN\LFLRVCAP.DWG

Figure 10
Peak Hour Load Factor Values by Peak Load Point



c. Run and Cycle Times by Line

Cycle time is the round trip travel time for a train and its operator on a particular line. Cycle time includes the run times from one end of the line and back as well as schedule recovery and operator break time. The run and cycle times for the MAX lines and the resulting daybase train requirements are as follows:

MAX Line and Alignment	One-way Run Time	Round Trip Cycle Time	2009 Daybase Headway in minutes	Number of Daybase Trains
Blue on X-Mall	96	230	15	16
Red on X-Mall	58	150	15	10
Yellow on Mall	34	90	15	6
Green on Mall	46	120	15	8

MAX Line and Alignment	One-way Run Time	Round Trip Cycle Time	2025-2030 Daybase Headway in minutes	Number of Daybase Trains
Blue on X-Mall	96	230	15	16
Red on X-Mall	69	180	15	12
Yellow on Mall Milwaukie	54	135	15	9
Yellow on Mall CRC	43	120	15	8
Green on Mall	46	120	15	8

d. Application of Loading Standards (Peak Load Point Headways)

In addition to the forecast peak loads, the projected number of LRVs that pass a peak load point in the peak direction during the peak hour is shown in Tables 2A and 2B. For the east, west and north peak load points the percent of achievable capacity is shown. When achievable capacity is projected to exceed 99%, the cell is shown shaded to indicate that ridership growth will be constrained by over-crowding until more peak service is provided.

e. Peak Vehicle Requirements

The peak vehicle requirements (PVRs) are shown at the top of Tables 2A and 2B with the additions for the extension projects. For the Milwaukie extension the fleet size with spares totals 156 in 2030. For the CRC extension the fleet size with spares totals 151 in 2030. The 127 figure is the existing fleet of 105 plus 22 for the initial I-205/Mall vehicle purchase, 18 of the 24 is expected to be available for service at start-up in September 2009. The 2030 totals include 8 LRVs for I-205 Green Line growth after 2018.

f. Gap and Ready Reserve Train Usage

After the introduction of Type 2 vehicles in October of 1997, Tri-Met did operate gap trains, when available, to mitigate the impact of more frequent mechanical failures which result in cars from the new fleet being taken out of service. As the Type 2 vehicles became more reliable the need for gap trains ended. In December 2008 Tri-Met plans to start operating two gap trains. The Mall shuttle train may also be used as a gap train for mechanical failures during the peak periods.

g. Maintenance Spares

There are three purposes for vehicle spares:

- to allow for routinely scheduled, preventative maintenance work to be performed during day and swing shifts in service bays that would otherwise be vacant
- to replace vehicles that fail in peak revenue service
- to allow for progressive overhaul and vehicle modification campaigns that take more than 1 or 2 shifts per car to complete.

See Section 7 for the maintenance program's elements.

h. Fleet Size and Spare Ratio

The fleet size, at any given time, is governed by:

- The Peak Vehicle Requirement (PVR) required to serve the current passenger demands
- Financial constraints
- Vehicle procurement constraints including minimum economical size of order and delivery schedule
- The spare ratio goal of 15% for the planning horizon year

The anticipated fleet size requirements for MAX between 2009 and 2030 with both South Corridor extensions and the CRC extension are summarized in Table 3. Based on the passenger demand model forecasts for 2030 the fleet will total 172 cars. The 45-car Type 5 fleet would contain, 8 cars for I-205/Mall growth, 21 cars for Milwaukie and 16 cars for CRC.

The spare ratio is the number of spares divided by the PVR. The spare ratio forecast is also shown in Table 3. A 15% spare ratio would be close to the lowest spare ratio in the rail transit industry. Achieving an even lower spare ratio would force uneconomical and inflexible operating and maintenance practices such as:

- concentrating the vast majority of maintenance during off-peak periods leaving maintenance bays idle several hours twice daily
- forcing more swing and graveyard shift work at higher wages and lower productivity while increasing the need for more maintenance bays.

Table 3
Fleet Deployment Plan
with Green Line starting 2009, Milwaukie starting in 2015 and CRC starting in 2016

September of	2007	2008	2009	2010	2030
Number of LRV's Required			w/ 18 T-4s	w/ 22 T-4s	W/ 45 T-5s
Blue Line (Gresham to Hillsboro) 15-minute daybase in 2-car trains	32	34	34	34	34
Blue Line peak trippers in 2-car trains	16	16	16	16	16
Red Line (Beaverton TC to Airport)	19	20	20		
Red Line peak trippers two 2-car trains		4	4		
Red Line (185th Ave. TC to Airport) 12 2-car trains				24	24
Gap Trains, optional			4	2	
Yellow Line (Downtown to Expo) 15-minute daybase, 6 trains	9	10	10	12	
Yellow Line (Downtown to Clark College) 15-minute daybase, 8 trains					16
Yellow Line peak trippers, 2 trains until 5 additional for CRC in 2030	3	3	3	4	14
Green Line (Downtown to Expo) 15-minute daybase, 8 trains			12	16	16
Green Line peak trippers, 2 trains			2	2	10
Mall Shuttle, 1 train			1	1	
Milwaukie daybase 4 additional 2-car trains					8
Milwaukie peak trippers, 3 to 5 additional in 2-car trains					10
Total Peak Vehicle Requirement (PVR)	79	87	106	111	148
Number of Spares	24	16	15	16	24
Active Fleet Size (PVR + Spares)	103	103	121	127	172
Spare Ratio (Spares / PVR)	30%	18%	14%	14%	16%
Total Fleet Size	105	105	123	127	172

Notes: In March 2008 a daybase Blue Line train was added to accommodate operator meal breaks.
September 2009 at start-up shows situation with 18 of 22 Type 4s and 24 of 26 Type 1s available for service.
The 2030 Type 5 fleet includes: 8 for Green Line growth, 21 for Milwaukie to Park Ave. and 16 for CRC to Clark College.

6) Supply of Revenue Vehicles

a) Financial Constraints

Tri-Met carefully studies the capital and operating (financial) implications of expanding the fleet. This is done in the context of the Agency's overall financial planning process. Every year Tri-Met updates its five-year capital and operating financial forecasts. While financially sound, agency resources are scarce. The purchase of vehicles requires either federal funding assistance, the issue of Tri-Met long-term debt, or both. Equally important, operating costs are forecast so that local, continuing-revenue, sources will adequately meet any new continuing-expenditures.

b) Vehicle Purchasing Constraints

Like most light rail systems in the United States, Tri-Met vehicle specifications are unique to Portland. Thus, there are several "logistical" constraints to purchasing vehicles. First, purchase orders require a long (several years) lead-time to allow adequate time for the manufacture and transport of thousands of precision components, as well as the fabrication, assembly, and testing of the vehicles. Second, due to the long lead times, purchase orders of fewer than ten vehicles are uneconomical. For these reasons it is not possible to quickly purchase a few vehicles in response to an unexpected surge in ridership. On the contrary, large orders are placed years in advance for any project or extension.

To provide flexibility, the I-205/Mall LRV contract included options for 1 to 24 additional LRVs during car building and a minimum of 6 after the initial group is built.

c) Fleet Life Cycle

TriMet's anticipated replacement cycle for LRVs is 36 years. The 26 Type 1 vehicles are due for replacement prior to 2025 see the vehicle replacement schedule in Appendix B. These LRVs are subject to a sale and leaseback arrangement that has penalties for early retirement. Type 1 vehicles are currently undergoing a full body rebuild after 18 years of service, this is the only body rebuild planned before retirement. To help maintain reliability these cars may be assigned to trains with shorter runs to reduce annual mileage. TriMet intends to maintain these vehicles via progressive overhauls until their retirement to assure a high level of in-service reliability and a reasonable resale value. If the possibility of resale looks doubtful during the last few years prior to retirement, then the deferral of some maintenance prior to sale for scrap will be considered.

7) Maintenance and Reliability

a) Maintenance Program Elements

Tri-Met's overall LRV maintenance program consists of seven distinct, but mutually supportive maintenance work programs: preventive maintenance, running repairs, component rebuild, progressive overhaul, scheduled maintenance, modifications (product improvements), and equipment engineering analysis and training. These seven work programs require about 115,000 labor hours per year for the 105-car fleet, or just under 1,100 labor hours per year per vehicle.

<u>Preventive Maintenance (35% of total labor hours)</u>

Preventive Maintenance (PM) inspections, including correction of defects found, are performed on a consistent schedule based on mileage. PM inspections are scheduled at an interval of 4,500 miles, as 18 sequential inspections every 81,000 miles (approximately 14 months of mileage per vehicle), including specific subsystem and component inspections and servicing appropriate to each successive PM in the sequence. Any periodic, scheduled inspection and maintenance tasks with intervals greater than 81,000 miles are performed under the Progressive Overhaul program.

The PM program content and intervals are based on manufacturer recommendations, refined through continuous analysis by equipment engineering staff, maintenance supervisors and technicians. Physical inspections of components and systematic data tracking of failures and repairs are continually analyzed to maximize both effectiveness and efficiency of the PM program. See Appendix C for a description of PM Inspections and their respective mileage intervals by LRV type. Items with a 0 for the mileage interval are no longer covered by technicians during PMs instead they are performed as running repairs when reported by operators or cleaners.

TriMet’s goal is to complete at least 95% of PM inspections on time. The actual monthly rate is usually 99%

<u>Running Repairs (21% of total labor hours)</u>

Running Repairs diagnose and correct defects on vehicles identified during revenue service and reported to LRV Maintenance by Transportation personnel. Vandalism and accident repairs are also classified under the Running Repairs program.

<u>Component Rebuild (4% of total labor hours)</u>

The component (or unit) rebuild program refers to repairable equipment removed and replaced on the vehicle. Such equipment components or subsystems are rotated through the component rebuild section of LRV Maintenance in appropriate cycles so as to maintain availability of rebuilt or repaired components to meet running repair requirements for removal and replacement of such components. This allows much faster return of defective vehicles to service. Component rebuild production and quality is under dedicated supervision, and is also supported by equipment engineering analysis and product improvement modifications at the component/subsystem level.

Progressive Overhaul (22% of total labor hours)

Tri-Met's LRV maintenance program seeks to keep current with the entire scope of vehicle maintenance requirements, and therefore seeks to avoid requirements for mid-life remanufacturing for its LRVs. Accordingly, long-cycle tasks (beyond the 81,000 PM program cycle) are also scheduled, based on continuing fleet condition assessment and design of overhaul campaigns. Each overhaul campaign bundles multiple overhaul tasks which are now due, for simultaneous performance on each vehicle cycled through the campaign, for efficient overhaul program production. This progressive overhaul approach was recognized by USDOT in a 1995 report as best-practice in the rail transit industry, preferable to mid-life vehicle remanufacturing in terms of keeping the fleet continuously in service at a higher spare ratio and in minimizing fleet life-cycle total cost. See Appendix C for a list of scheduled overhauls by LRV type.

Scheduled Maintenance (13% of total labor hours)

Other scheduled maintenance tasks that are outside of preventive maintenance or progressive overhaul and are scheduled from time of completion, from measured wear limit or by seasonal requirements are captured under scheduled maintenance. Maintenance tasks such as wheel truing, car floor height adjustment, and brake disc truing are examples of scheduled maintenance.

Modifications (product improvements are 5% of total labor hours)

Modifications are product improvements made to (1) increase vehicle reliability by decreasing failure and wear rates, (2) increase maintainability by easing or decreasing maintenance tasks, and (3) increase customer service by improving vehicle amenities or comfort.

Vehicle reliability and maintainability modifications are an ever-present element of the LRV maintenance program, and arise out of continuous analysis by equipment engineering staff, maintenance supervisors and technicians. Introduction of a new-type vehicle fleet to operate in train consists with existing vehicle types can also require considerable modifications to existing vehicle types, as was required for Tri-Met's Type 1 LRVs when the Type 2 LRVs were introduced. The new curved platforms on the Portland Transit Mall resulted in the addition of side view CCTV on the entire LRV fleet. Customer service modifications have include retrofitting air conditioning to the Type 1 LRVs, retrofitting CCTV surveillance to Type 1 and 2 LRVs, and modifying interior stanchions of Type 2 LRVs to increase bicycle boarding accommodations. See Appendix C for a priority list of modifications by LRV type.

Equipment Engineering Analysis and Training (less than 1% of total labor hours)

Equipment engineering analysis and training functions are provided through a 4-member staff unit working in a team effort with maintenance supervisors and technicians, continuously analyzing failure data among component subsystems, refining maintenance techniques (e.g., procedures and training, including PM program effectiveness), and developing product improvement modifications.

The equipment engineering staff is dual-function, by also serving as LRV maintenance trainers. Training program elements include (1) initial training of apprentices from Tri-Met's maintenance helper classification to become LRV maintenance technicians (30-month program of classroom and on-the-job training), (2) technician recurrent training, and (3) training of technicians and apprentices on modifications, new or revised maintenance procedures, and new types of LRVs or maintenance equipment.

b) Train Failure Definitions and Actions

Train failures can require the use of spare vehicles to maintain scheduled service. The term relevant failure has been used to define which failures are used to calculate the mean distance between failures (MDBF).

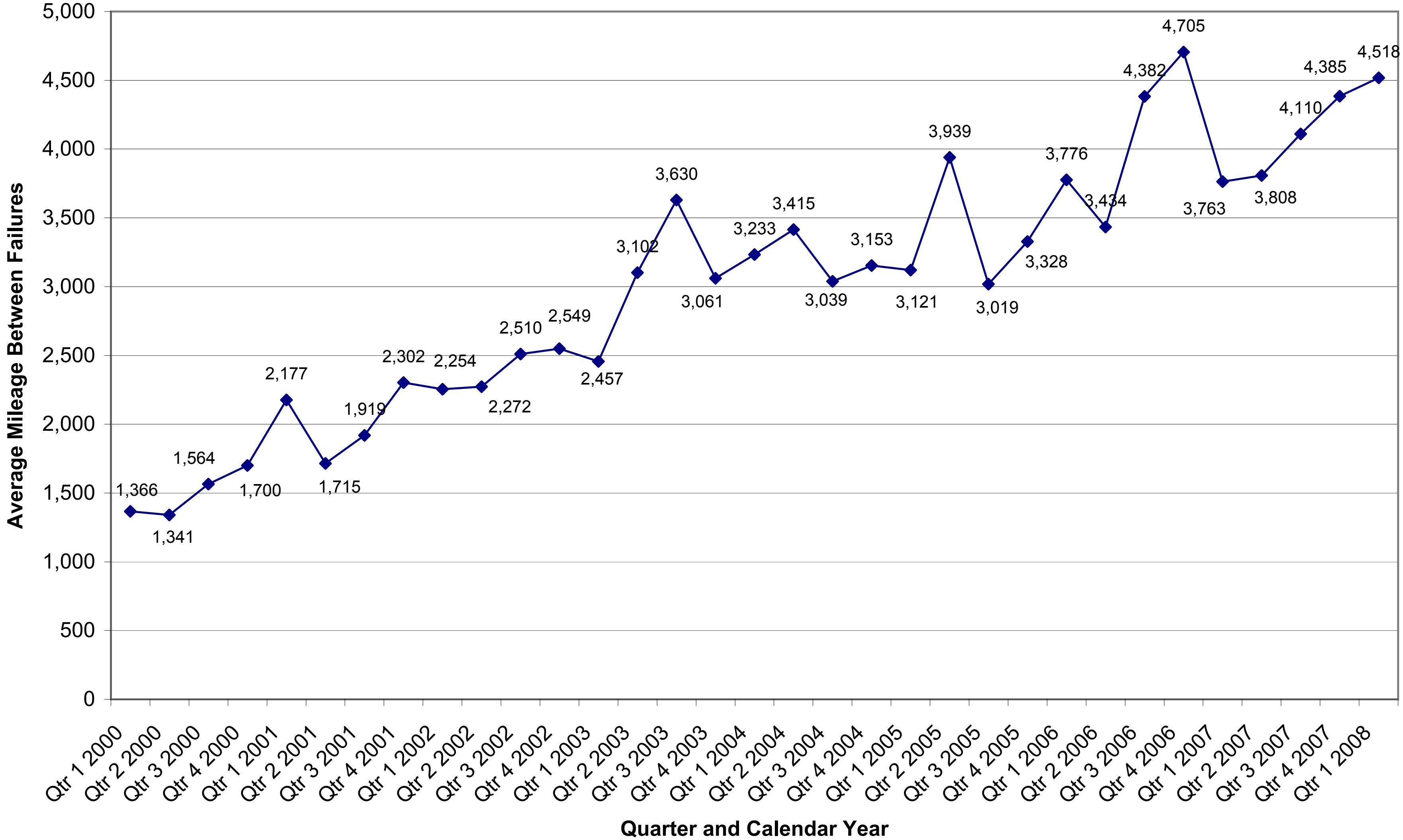
Relevant failures used in Tri-Met's traditional calculation of the mean distance between failures (MDBF) include any independent failure of an item which results in any of the following:

1. A four-minute or longer delay of revenue service.
2. Failure to enter revenue service at the scheduled time.
3. Need to remove a vehicle from revenue service.
4. Failure of the ventilation system.
5. Door and bridgeplate system failure that requires two or more doors or bridgeplates per car to be cutout.

Relevant failures varied between 7,500 miles and 25,000 miles between 2000 and 2004. Problems with the software's tracking of delays between 2004 and 2008 resulted in erratic data of little use for measuring trends in vehicle reliability.

In Fall of 2000, a new measure of vehicle reliability was developed, for more precision in measuring reliability, determining trends and meeting TriMet's goal of continuous improvement in LRV reliability. This service related failures measure is based on the number of times any symptom code is used to log in a repair on the pending worklist, see Appendix D for examples. There has been much improvement in this measure of MDBF since 2001, from below 2,000 miles to above 4,000 miles, see Figure 11.

Figure 11
Service Related Failures
Mean Distance Between Failures (MDBF)



Appendices

- A. TCRP Report 13 “Rail Transit Capacity” – 1996
- B. CIP Replacement Table
- C. PM Inspections, Progressive Overhauls and Modifications
- D. Service Related Failures MDBF Oct-Dec 2007

Appendix A

TCRP Report 13

Rail Transit Capacity

1996

TRANSIT COOPERATIVE RESEARCH PROGRAM

SPONSORED BY

The Federal Transit Administration

TCRP Report 13

Rail Transit Capacity

Transportation Research Board
National Research Council

2. Capacity Basics

2.1 INTRODUCTION

Capacity is an important measure of a rail transit system's passenger-handling capability. It is determined to ensure that a line is built, expanded or re-equipped with adequate facilities to handle the peak-hour passenger demands both in the near and long term, comfortably and safely. Other applications for capacity information are as follows:

- project planning and operations analysis for new starts and extensions,
- evaluating transit line performance,
- establishing and updating service standards,
- studying environmental impacts,
- assessing the capacities of new signaling and control technologies,
- estimating changes in system capacity and operations over time, and
- assessing capacity impacts in land-development studies where transit is expected to provide a significant role in site access.

This chapter defines capacity and develops an initial framework to analyze and determine the capacity of rail transit modes in North America.

2.2 TERMINOLOGY

2.2.1 DEFINITIONS

The North American rail transit industry is inconsistent in its use of terminology. Numerous reviewed reports use the same term to mean different things. Several reports develop their own definitions.

Chapter 13 provides a project glossary derived from the TRB and APTA transit glossaries. These definitions are used consistently throughout the report. Where reference must be made to an alternative definition, the variation is clearly noted in the text or via an accompanying footnote.

Note that headway and capacity are inversely related and this can be a source of confusion. The *minimum* or *closest* headway delivers the *maximum* capacity.

2.2.2 FOOTNOTES AND REFERENCES

To avoid duplication, references are shown as [(R23)] and refer to the Bibliography of Chapter 12 and the literature review item of the same number in Appendix One. Footnotes are shown by an italicized superscript number[a] referenced to the bottom of each page.

2.3 GROUPING

Following the extensive literature review and data collection, for the purpose of capacity analysis, the four modes of rail transit in this study have been grouped into categories based on alignment, equipment, train control and operating practices.

The first category is fully segregated, signaled, double-track right-of-way, operated by electrically propelled multiple-unit trains. This is the largest category encompassing all rail rapid transit[1], all noninstitutional automated guideway transit[2], several light rail sections—for example, the Market Street subway in San Francisco, and several commuter rail lines on the east coast. This category is termed *Grade Separated Rail*.

The second category is light rail without fully segregated tracks, divided into on-street operations and right-of-way with grade crossings. Streetcar only operations (Toronto and New Orleans) is a sub-set of the on-street section.

The third category is commuter rail other than services in category one.

The fourth category is automated guideway transit (AGT). Although most AGT is a sub-set of the main category, *Grade Separated Rail* with very short trains, the use of off-line stations—on certain systems—is unique to this mode and requires separate examination. Off-line stations can also increase the capacity of more conventional rail transit as discussed in Chapter Six, *Operating Issues*.

Each of these categories is provided with its own chapter with the procedures for determining capacity.

- Chapter 7 *Grade Separated Rail Capacity Determination*
- Chapter 8 *Light Rail Capacity Determination*
- Chapter 9 *Commuter Rail Capacity Determination*
- Chapter 10 *AGT Capacity Determination*

2.4 THE BASICS

Professor Richard Soberman in the *Canadian Transit Handbook*[(R19)] states:

The capacity of transit service is at best an elusive

[1] The minor exceptions where there are grade crossings on rail rapid transit (CTA) will be discounted. Routes with more than two tracks will be discussed relative to express, local and skip-stop service. However, it is not intended to otherwise develop unique capacity calculations for multiple track routes.

[2] The Morgantown automated guideway transit, the only North American example of AGT with off-line stations, is not classed as a public operation by APTA.

figure because of the large number of qualifications that must be attached to any measure of capacity that is adopted.

Most of the capacity calculations in the literature add constants, multipliers, reductive factors or other methods to correlate theory with practice.

In this study emphasis has been placed on reducing the number of qualifications and quantifying, describing and explaining adjustments between theory and practice in determining rail transit capacity.

The literature is in general agreement on a definition of rail transit capacity as:

> *The maximum number of passengers that can be carried in an hour, in one direction on a single track.*

Several papers add refinement to compensate for diversity of loading within the maximum peak hour. This compensated definition was referred to in some cases as the *practical maximum rail transit capacity*. Other definitions added qualifiers such as: *sustainable over a peak hour without impedance* (to other trains) or the less restrictive *without unrecoverable delays to trains*.

This study is oriented to practical results and it would be logical to include peak-hour diversity in the definition of maximum capacity. In North America the diversity factor of total peak-hour capacity to peak-within-the peak capacity ranges from 0.70 to 0.95. The latter high factor, relates only to a few lines in New York and Mexico City. Most rail transit fits into the range of 0.75 to 0.90.

However, in practice it is correct, if somewhat misleading, to quote a maximum hourly capacity of 60,000 passengers, or passenger spaces, per peak-hour direction when, as passengers do not arrive evenly over the peak hour to fill this capacity, the actual number of passengers carried in one hour is 45,000.

This introduces the issue of supply and demand. This study determines supply—the number of passenger spaces per peak hour per track that is provided—not the number of passengers actually carried. Although demand is not within the scope of the study, a secondary issue has been added to examine demand with particular respect to station constraints—inadequate platform size, number of exits, ticketing throughput and parking limitations—discussed in Chapter Six, *Operating Issues*.

To avoid any confusion between supply and demand, and to avoid confusion with other work, the study uses two definitions of capacity.

> **Design Capacity**
>
> *The maximum number of passenger spaces past a single point in an hour, in one direction on a single track.*

Design capacity is similar to, or the same as, *maximum capacity*, *theoretical capacity* or *theoretical maximum capacity*—expressions used in other work. It makes no allowance for whether those spaces going by each hour will be used—they would be fully used only if passengers uniformly filled the trains throughout the peak hour. This does not occur and a more practical definition—sometimes referred to as *practical capacity*—is required. Achievable capacity takes into account that demand fluctuates over the peak hour and that not all trains—or all cars of a train—are equally and uniformly full of passengers.

> **Achievable Capacity**
>
> *The maximum number of passengers that can be carried in an hour in one direction on a single track allowing for the diversity of demand.*

Unless otherwise stated, reference in the study to passenger capacity means the achievable capacity of a single line.

Reference to single track is necessary as most rail rapid trunk routes in New York[3] have three or four tracks while the Broad Street subway in Philadelphia and the North Side L in Chicago have four tracks. The capacity of four-track lines is not a simple multiple of two single tracks and varies widely with operating practices—the merging and dividing of local and express services and train holding at stations for local-express transfers. The result is that, given adequate demand, four tracks can theoretically increase capacity by 80% over a double-track line—although 50% is more typical. A third express track does not necessarily increase capacity at all when restricted to the same *close-in* limitations at stations with two platform faces.

Design capacity has two factors, line capacity and train capacity, and can be expressed as shown in Figure 2.1. In turn the achievable capacity can be expressed as shown in Figure 2.2. The basic capacity expression can be expanded as shown in Figure 2.3. This expression of Figure 2.4 determines the number of trains per hour and is the inverse of the closest or minimum headway. The relevant minimum train separation in seconds is the minimum time to approach and leave a station, i.e., the time from when a train starts to leave a station until the following train can berth at that station. This is referred to as the *close-in* time.

DESIGN CAPACITY	=	LINE CAPACITY maximum throughput in TRAINS / HOUR	X	TRAIN CAPACITY number of PASSENGER SPACES

Figure 2.1 Basic design capacity expression

ACHIEVABLE CAPACITY	=	DESIGN CAPACITY	X	PEAK HOUR DIVERSITY FACTOR

Figure 2.2 Basic achievable capacity expression

[3] All New York four-track trunks merge into double-track sections, tunnels or bridges, crossing the Harlem and East Rivers.

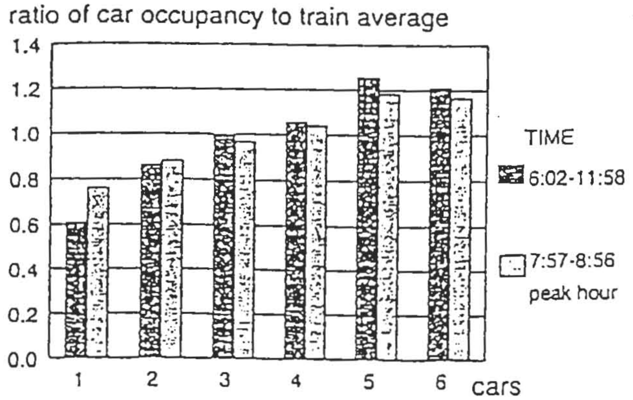


Figure 5.10 TTC Yonge Subway, Wellesley Station southbound, a.m. peak-period average passenger distribution between cars of train. Jan 11, 1995, 99 trains with 66,263 passengers

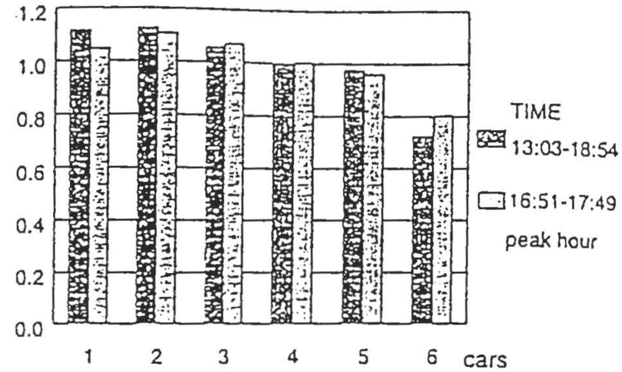


Figure 5.11 TTC Yonge Subway, Wellesley Station northbound, p.m. peak-period average passenger distribution between cars ot train. Jan 11, 1995, total 69,696 passengers on 108 trains

second and third cars of the train. While the second car is the most heavily loaded, the third is the lightest loaded indicating the influence of entrance/exit locations at other major stations.

There is no significant variation in the average loading diversity between the peak hour and the peak-period both of which remain within the range of +5% to -6%. The unbalance for cars on individual trains ranges from +61% to -33%. The uniformity of loading can be attributed to four factors—the short trains, wide platforms, close headways and dispersed entrance/exit locations between the stations of this automated, driverless system. The Toronto Transit Commission's Yonge Street subway shows a more uneven loading between cars in Figure 5.10. In the morning peak period the rear of the train is consistently more heavily loaded reflecting the dominance of the major transfer station at Bloor with the interchange at the northern end of the Yonge platform. As would be expected, there is little variation in the average car loading diversity between the peak hour and the peak period due to the pressures on passengers to spread along the platforms at busy times. The average diversity of individual car loading over the peak period has a range of +26%to -39%. The unbalance for cars on individual trains ranges from +156% to -89%.[15] In the afternoon peak period shown in Figure 5.11, the reverse occurs with the front of the train most heavily loaded—despite the principal entrances at the two major downtown station being toward the rear of the train. There is less variation in the average car loading diversity between the peak hour and the peak period than in the morning. The average diversity of individual car loading over the peak period has a range of +13% to -28%. The unbalance for cars on individual trains ranges from +113% to -72%. These ranges are lower than in the morning reflecting the less intense peak-within-the-peak in the pm rush hour.

It is this peak-within-the-peak that provides the third and most important diversity factor, termed the *peak-hour loading diversity factor* and defined by:

$$D_{ph} = \frac{R_{hour}}{4R_{15min}} \qquad \text{Equation 5-1}$$

where D_{ph} = Diversity factor—peak hour
R_{hour} = Ridership in peak hour
R_{15min} = Ridership in peak 15 min

Passengers do not arrive evenly and uniformly on any rail transit system as shown dramatically over the extended peak period in

Table 5.14 Diversity of peak hour and peak 15 min[16]

Type	System	Routes	Diversity factor
CR	CalTrain	1	0.64
CR	GO Transit	7	0.49
CR	LIRR	13	0.56
CR	MARC	3	0.60
CR	MBTA	9	0.53
CR	Metra	11	0.63
CR	Metro-North	4	0.75
CR	NICTD	1	0.46
CR	NJT	9	0.57
CR	SCRRA	5	0.44
CR	SEPTA	7	0.57
CR	STCUM	2	0.71
CR	Tri-Rail	1	0.25[17]
CR	VRE	2	0.35
CR	Sum/Average	74	0.56
LRT	CTS	2	0.62
LRT	Denv. RTD	1	0.75
LRT	SEPTA	8	0.75
LRT	Tri-Met	1	0.80
LRT	Sum/Average	12	0.73
RT	BCT	1	0.84
RT	CTA	7	0.81
RT	MARTA	2	0.76
RT	MDTA	1	0.63
RT	NYCT	23	0.81
RT	PATCO	1	0.97
RT	PATH	4	0.79
RT	STCUM	4	0.71
RT	TTC	3	0.79
RT	Sum/Average	46	0.79
All	Sum/Average	133	0.67

[15] One car of one train was completely empty (-100%), possibly due to an incident or defective doors. This outlier was excluded from the data set.

[16] This peak-hour diversity factor is the same as the peak-hour factor (phf) in the Highway Capacity Manual[R47].

[17] Service is only one train per hour and is not included in the average.

Appendix B
CIP Replacement Table

TABLE 2. VEHICLES SYSTEMS - LIGHT RAIL VEHICLES

ITEM REQUIRED	TOTAL FLEET	ACTION NEEDED	YEAR NEEDED	CURRENT AGE FY2005	OPTIMUM/ MINIMUM REPLACEMENT CYCLE[1]	CONDITION	2005	2006	2007	2008	2009	FY2005-2009 TOTAL
LIGHT RAIL VEHICLES												
Eastside - Light Rail Vehicles	26	Replace	2022	19	36	1	$0	$0	$0	$0	$0	$0
Westside - Light Rail Vehicles	46	Replace	2034	7	36	1	$0	$0	$0	$0	$0	$0
Airport - Light Rail Vehicles	6	Replace	2036	5	36	1	$0	$0	$0	$0	$0	$0
Interstate[2] - Light Rail Vehicles	27	Replace	2040	1	36	1	$0	$0	$0	$0	$0	$0
Total	**105**						**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

NOTES:
1. Replacement cycles assume preventive maintenance and progressive overhaul programs throughout vehicle life.
2. Include 10 option cars

ITEM	DESCRIPTION	Location	Frequency	N01	N02	N03	N04	N05	N06	N07	N08	N09	N10	N11	N12	N13	N14	N15	N16	N17	N18	A-END	B-END	Update Date	C
			Freq.	4.5	9	13.5	18	22.5	27	31.5	36	40.5	45	49.5	54	58.5	63	67.5	72	76.5	81			12/3/02	
100	Gearbox Oil Sample/Change	Under Car	40.50								1									1				11/25/02	--------
105	Drain Labyrinth Seals	Under Car	13.50	1			1			1			1			1			1					12/3/02	--------
120	Check Truck Appurtenances	Under Car	9.00	1		1		1		1		1		1		1		1		1				12/3/02	
130	Track Brake Assemblies	Under Car	9.00	1		1		1		1		1		1		1		1		1				12/3/02	
132	1/4 Turn Brake Actuators	Under Car	9.00		1		1		1		1		1		1		1		1		1			12/3/02	
135	Inspect Brake Pads and Disc	Under Car	4.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			12/3/02	
137	Caliper Pivot Pin Lubrication	Under Car	40.50								1								1					3/12/03	
139	Take Brake Fluid Sample	Under Car	0																			----------		10/20/04	
155	Test Load Weigh Sensor	Under Car	27.00			1						1						1						12/3/02	
185	Auxiliary Inverter (Power Down)	Under Car	40.50					1									1					---------		12/3/02	--------
190	Inspect Carbody	Car Body and Interior	40.50						1									1						12/3/02	
205	Operators Seat	Car Body and Interior	40.50						1									1						12/3/02	--------
220	Check Emergency Equipment	Car Body and Interior	40.50									1									1			12/3/02	--------
225	Test Communication System	Car Body and Interior	27.00					1						1						1				12/3/02	
226	PA Volume Adjustment	Car Body and Interior	81.00	1																		---------		3/12/03	--------
235	Check Window Wiper	Car Body and Interior	9.00		1		1		1		1		1		1		1		1		1			12/3/02	--------
245	HVAC	Roof Top	9.00		1		1		1		1		1		1		1		1		1			12/3/02	--------
250	HVAC (Extensive)	Roof Top	27.00		1						1						1							12/3/02	--------
265	Check Door Operation and Safety System	Car Body and Interior	4.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			12/3/02	--------
270	Doors Adjustment	Car Body and Interior	81.00								1													12/3/02	--------
275	Door Lubrication	Car Body and Interior	40.50			1									1									12/3/02	--------
280	Door Summary	Car Body and Interior	40.50			1									1									12/3/02	--------
295	Lighting/Dest. Signs	Car Body and Interior	27.00						1						1						1			12/3/02	--------
300	Couplers	Under Car	13.50	1			1			1			1			1			1					12/3/02	--------
301	Couplers Electrical Contacts	Under Car	4.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			12/3/02	--------
302	Coupler (Extensive)	Under Car	40.50				1									1								12/3/02	--------
310	Inspect Interior Electrical Compartments	Car Body and Interior	13.50	1			1			1			1			1			1					12/3/02	--------
312	CCTV Test	Car Body and Interior	40.50							1									1				--------	3/12/03	--------
315	Interior Electrical Compartments (Extensive)	Car Body and Interior	81.00						1															12/3/02	
325	Manual Brake Release Pump	Car Body and Interior	18.00		1				1				1				1				1			12/3/02	
330	Test Sandbox Heaters	Car Body and Interior	81.00		1																			12/3/02	--------
335	Test "Emergency" Mushroom Operation	Car Body and Interior	9.00	1		1		1		1		1		1		1		1		1				12/3/02	--------
340	ATS System Functional Test	Car Body and Interior	9.00		1		1		1		1		1		1		1		1		1			12/3/02	
350	Event Recorder (Train-Logger)	Car Body and Interior	40.50			1									1							---------		12/3/02	--------
370	Brake and Power Test	Car Body and Interior	4.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			12/3/02	--------
371	Pad Force Measurement	Under Car	81.00						1															12/3/02	
385	Inspect Ground Brushes (Power Down)	Under Car	40.50			1									1									12/3/02	
390	DC-DC Converter (Power Down)	Under Car	40.50				1									1							---------	12/3/02	--------
400	Inspect Traction Motors (Power Down)	Under Car	4.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			12/3/02	--------
401	Traction Motor Cleaning (Power Down)	Under Car	9.00	1		1		1		1		1		1		1		1		1				12/3/02	--------
403	Check contactor timing (Power Down)	Under Car	40.50					1									1							7/14/04	--------
405	Clean and Inspect Exterior Electrical Compartments	Under Car	13.50		1			1			1			1			1			1				12/3/02	
410	Exterior Electrical Compartments (Extensive)	Under Car	81.00		1																			12/3/02	
415	Inspect Batteries	Under Car	27.00						1						1						1		---------	12/3/02	--------
425	Inspect Roof Mounted Equipment (Power Down)	Roof Top	9.00	1		1		1		1		1		1		1		1		1				11/5/03	
445	Pantograph (Power Down)	Roof Top	4.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	--------		12/3/02	--------
450	Pantograph (Extensive)	Roof Top	40.50			1									1							--------		12/3/02	--------
455	Articulation Roof Linkage	Roof Top	81.00									1										--------	--------	12/3/02	
456	Articulation Floor Swivel Plate	Car Body and Interior	81.00											1								--------	--------	12/3/02	
461	Lubricate Slewing Ring	Under Car	81.00											1										3/12/03	

ITEM	DESCRIPTION	Location	Frequency	N21	N22	N23	N24	N25	N26	N27	N28	N29	N30	N31	N32	N33	N34	N35	N36	N37	N38	A-END	B-END	UpdateDate	C
			Freq.	4.5	9	13.5	18	22.5	27	31.5	36	40.5	45	49.5	54	58.5	63	67.5	72	76.5	81			12/9/03	
LF 120	Truck appurtenances	Under Car	9.00	1		1		1		1		1		1		1		1		1				12/9/03	
LF 122	Traction motor cleaning (Power Down)	Under Car	81.00						1															12/9/03	---------
LF 125	Ground brushes (Power Down)	Under Car	27.00	1						1						1								12/9/03	
LF 130	Transmission oil sample /breather /Change	Under Car	40.50									1									1			12/9/03	---------
LF 135	Transmission Breather (see above)	Under Car	0.00																					12/9/03	
LF 140	Track brakes	Under Car	9.00	1		1		1		1		1		1		1		1		1				12/9/03	
LF 145	Friction brakes	Under Car	4.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			12/9/03	
LF 147	Friction brakes caliper lubrication	Under Car	81.00	1																				12/9/03	
LF 149	E.H. Unit Accumulator/M.R.U.	Under Car	27.00				1						1						1					12/9/03	
LF 150	Sanding system	Under Car	9.00	1		1		1		1		1		1		1		1		1				12/9/03	---------
LF 152	Sand Box Heater Test	Car Body and Interior	81.00				1																	12/9/03	---------
LF 155	Load Weight Sensor	Under Car	27.00		1						1						1							12/9/03	
LF 165	ATS	Car Body and Interior	9.00		1		1		1		1		1		1		1		1		1			12/9/03	
LF 170	Passenger seating	Car Body and Interior	0.00																					12/9/03	
LF 172	Flooring	Car Body and Interior	0.00																					12/9/03	
LF 175	Operator seat Lubrication	Car Body and Interior	40.50						1									1						12/9/03	---------
LF 180	Cab equipment	Car Body and Interior	0.00																					12/9/03	
LF 185	Windshield wiper / washer	Car Body and Interior	9.00	1		1		1		1		1		1		1		1		1				12/9/03	---------
LF 186	Windshield Wiper Linkage	Car Body and Interior	40.50			1									1									12/9/03	---------
LF 190	Communication system	Car Body and Interior	27.00	1						1						1								12/9/03	
LF 192	Test Radio Power	Car Body and Interior	0.00																					12/9/03	
LF 197	Event recorder	Car Body and Interior	40.50				1									1						---------		12/9/03	---------
LF 200	Emergency equipment	Car Body and Interior	40.50									1									1			12/9/03	
LF 205	Lighting / destination signs	Car Body and Interior	27.00				1						1						1					12/9/03	
LF 210	Interior electrical compartments	Car Body and Interior	20.25			1				1				1				1			1			12/9/03	---------
LF 211	CCTV Test	Car Body and Interior	40.50				1									1							---------	12/9/03	---------
LF 212	Interior electrical compartments (extensive)	Car Body and Interior	81.00			1																		12/9/03	
LF 215	Doors Operation/Safety	Car Body and Interior	4.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			12/9/03	---------
LF 216	Doors Adjust and Timing	Car Body and Interior	81.00															1						12/9/03	---------
LF 220	Doors lubrication	Car Body and Interior	40.50					1									1							12/9/03	---------
LF 221	Door / Bridgeplate Summary	Car Body and Interior	40.50						1									1						12/9/03	---------
LF 225	Bridgeplates Operation/Safety	Car Body and Interior	9.00		1		1		1		1		1		1		1		1		1			12/9/03	---------
LF 226	Bridgeplates Adjust and Timing	Car Body and Interior	81.00																1					12/9/03	---------
LF 230	Bridgeplates lubrication	Car Body and Interior	40.50						1									1						12/9/03	---------
LF 235	Coupler electrical head	Under Car	4.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			12/9/03	---------
LF 240	Coupler	Under Car	13.50		1			1			1			1			1			1				12/9/03	---------
LF 245	Coupler (extensive)	Under Car	40.50		1									1										12/9/03	---------
LF 250	Car body (Power Down)	Car Body and Interior	40.50	1									1											12/9/03	
LF 251	Articulation	Car Body and Interior	40.50				1									1						----------	----------	12/9/03	
LF 255	Auxiliary Inverter (Power Down)	Roof Top	13.50		1			1			1			1			1			1				12/9/03	---------
LF 260	Exterior electrical compartments (extensive - Pwr Down)	Roof Top	81.00												1									12/9/03	
LF 265	Propulsion TCU Download	Car Body and Interior	4.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			12/9/03	---------
LF 270	Propulsion container cleaning (Power Down)	Roof Top	13.50			1			1			1			1			1			1			12/9/03	---------
LF 275	High Speed Circuit Breaker (Power Down)	Roof Top	81.00										1									---------	---------	12/9/03	
LF 290	Knife switch (Power Down)	Roof Top	81.00												1							---------	---------	12/9/03	
LF 300	HVAC (Power Down)	Roof Top	9.00		1		1		1		1		1		1		1		1		1			12/9/03	---------
LF 305	HVAC (extensive - Power Down)	Roof Top	27.00				1						1						1					12/9/03	---------
LF 315	Pantograph (Power Down)	Roof Top	4.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	---------	---------	12/9/03	
LF 320	Pantograph (extensive - Power Down)	Roof Top	40.50		1									1								---------	---------	12/9/03	
LF 322	Transverse shock absorber lubrication (Power Down)	Roof Top	20.25			1				1				1				1				---------	---------	7/1/04	
LF 325	Batteries (Power Down)	Roof Top	27.00						1						1						1		---------	12/9/03	---------
LF 191	PA Volume Adjustment	Car Body and Interior	81.00					1															---------	12/9/03	---------
LF 198	Automated Passenger Counting	Car Body and Interior	0.00																					12/9/03	

ITEM	DESCRIPTION	Location	Frequency	N41	N42	N43	N44	N45	N46	N47	N48	N49	N50	N51	N52	N53	N54	N55	N56	N57	N58	A-END	B-END	UpdateDate	C
			Freq.	4.5	9	13.5	18	22.5	27	31.5	36	40.5	45	49.5	54	58.5	63	67.5	72	76.5	81			12/3/02	
LF 120	Truck appurtenances	Under Car	9.00	1		1		1		1		1		1		1		1		1				12/9/03	
LF 122	Traction motor cleaning (Power Down)	Under Car	81.00						1															12/9/03	---------
LF 125	Ground brushes (Power Down)	Under Car	27.00	1						1						1								12/9/03	
LF 130	Transmission oil sample /breather /Change	Under Car	40.50									1									1			12/9/03	---------
LF 135	Transmission Breather (see above)	Under Car	0.00																					12/9/03	
LF 140	Track brakes	Under Car	9.00	1		1		1		1		1		1		1		1		1				12/9/03	
LF 145	Friction brakes	Under Car	4.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			12/9/03	
LF 147	Friction brakes caliper lubrication	Under Car	81.00	1																				12/9/03	
LF 149	E.H. Unit Accumulator/M.R.U.	Under Car	27.00				1						1						1					12/9/03	
LF 150	Sanding system	Under Car	9.00	1		1		1		1		1		1		1		1		1				12/9/03	---------
LF 152	Sand Box Heater Test	Car Body and Interior	81.00				1																	12/9/03	---------
LF 155	Load Weight Sensor	Under Car	27.00		1						1						1							12/9/03	
LF 165	ATS	Car Body and Interior	9.00		1		1		1		1		1		1		1		1		1			12/9/03	
LF 170	Passenger seating	Car Body and Interior	0.00																					12/9/03	
LF 172	Flooring	Car Body and Interior	0.00																					12/9/03	
LF 175	Operator seat Lubrication	Car Body and Interior	40.50						1									1						12/9/03	---------
LF 180	Cab equipment	Car Body and Interior	0.00																					12/9/03	
LF 185	Windshield wiper / washer	Car Body and Interior	9.00	1		1		1		1		1		1		1		1		1				12/9/03	---------
LF 186	Windshield Wiper Linkage	Car Body and Interior	40.50			1									1									12/9/03	---------
LF 190	Communication system	Car Body and Interior	27.00	1						1						1								12/9/03	
LF 192	Test Radio Power	Car Body and Interior	0.00																					12/9/03	
LF 197	Event recorder	Car Body and Interior	40.50				1									1						---------		12/9/03	---------
LF 200	Emergency equipment	Car Body and Interior	40.50									1									1			12/9/03	
LF 205	Lighting / destination signs	Car Body and Interior	27.00				1						1						1					12/9/03	
LF 210	Interior electrical compartments	Car Body and Interior	20.25			1				1				1				1			1			12/9/03	---------
LF 211	CCTV Test	Car Body and Interior	40.50				1									1							---------	12/9/03	---------
LF 212	Interior electrical compartments (extensive)	Car Body and Interior	81.00			1																		12/9/03	
LF 215	Doors Operation/Safety	Car Body and Interior	4.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			12/9/03	---------
LF 216	Doors Adjust and Timing	Car Body and Interior	81.00															1						12/9/03	---------
LF 220	Doors lubrication	Car Body and Interior	40.50					1									1							12/9/03	---------
LF 221	Door / Bridgeplate Summary	Car Body and Interior	40.50						1									1						12/9/03	---------
LF 225	Bridgeplates Operation/Safety	Car Body and Interior	9.00		1		1		1		1		1		1		1		1		1			12/9/03	---------
LF 226	Bridgeplates Adjust and Timing	Car Body and Interior	81.00																1					12/9/03	---------
LF 230	Bridgeplates lubrication	Car Body and Interior	40.50						1									1						12/9/03	---------
LF 235	Coupler electrical head	Under Car	4.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			12/9/03	---------
LF 240	Coupler	Under Car	13.50		1			1			1			1			1			1				12/9/03	---------
LF 245	Coupler (extensive)	Under Car	40.50		1									1										12/9/03	---------
LF 250	Car body (Power Down)	Car Body and Interior	40.50	1									1											12/9/03	
LF 251	Articulation	Car Body and Interior	40.50				1									1						----------	----------	12/9/03	
LF 255	Auxiliary Inverter (Power Down)	Roof Top	13.50		1			1			1			1			1			1				12/9/03	---------
LF 260	Exterior electrical compartments (extensive - Pwr Down)	Roof Top	81.00												1									12/9/03	
LF 265	Propulsion TCU Download	Car Body and Interior	4.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			12/9/03	---------
LF 270	Propulsion container cleaning (Power Down)	Roof Top	13.50			1			1			1			1			1			1			12/9/03	---------
LF 275	High Speed Circuit Breaker (Power Down)	Roof Top	81.00										1									---------	---------	12/9/03	
LF 290	Knife switch (Power Down)	Roof Top	81.00												1							---------	---------	12/9/03	
LF 300	HVAC (Power Down)	Roof Top	9.00		1		1		1		1		1		1		1		1		1			12/9/03	---------
LF 305	HVAC (extensive - Power Down)	Roof Top	27.00				1						1						1					12/9/03	---------
LF 315	Pantograph (Power Down)	Roof Top	4.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	---------	---------	12/9/03	
LF 320	Pantograph (extensive - Power Down)	Roof Top	40.50		1									1								---------	---------	12/9/03	
LF 322	Transverse shock absorber lubrication (Power Down)	Roof Top	20.25			1				1				1				1			1	---------	---------	6/7/04	
LF 325	Batteries (Power Down)	Roof Top	27.00						1						1						1		---------	12/9/03	---------
LF 191	PA Volume Adjustment	Car Body and Interior	81.00					1															---------	12/9/03	---------
LF 198	Automated Passenger Counting	Car Body and Interior	0.00																					12/9/03	

REM - MDBF

for the combined months of

Oct-Nov-Dec 2007

The number of times, during the months listed above, a symptom code is used to log in a repair on the pending worklist.

SYMPTOM CODE	RVSR T3	MDBF T3 RVSR	GOALS for 10/07 MDBF	RVSR T2	MDBF T2 RVSR	GOALS for 10/07 MDBF	RVSR T1	MDBF T1 RVSR	GOALS for 10/07 MDBF	TYPES 1, 2, 3	MDBF All RVSR	GOALS for 10/07 FAILS	GOALS for 10/07 MDBF
S01 AUXILIARY INVERTER FAILURE	**3**	**164,576**	**229,344**	**8**	**108,567**	**94,602**	1	**110,963**	**80,418**	12	**122,769**	15	**110,269**
S02 CONVERTER FAILURE	**0**			**0**			3	**36,988**	**214,447**	3	**491,075**	2	**1,102,692**
S03 PANTOGRAPH FAILURE	**1**	**493,729**	**305,792**	**4**	**217,134**	**340,566**	2	**55,482**	**214,447**	7	**210,461**	6	**300,734**
S04 ACCIDENT DAMAGE	6	82,288		0			0			6	245,538		
S05 ARTICULATION FAILURE	0		458,688	0		851,416	1	110,963	321,670	1	1,473,226	3	551,346
S06 ATS/TWC FAILURE	**11**	**44,884**	**57,336**	**10**	**86,853**	**77,401**	10	**11,096**	**53,612**	31	**47,523**	25	**66,162**
S07 CAB ELECTRIC CONTROLS	4	123,432	57,336	16	54,283	77,401	10	11,096	64,334	30	49,108	24	68,918
S08 CARBODY/CAR/CAB INTER FAILURE	54	9,143		134	6,482		64	1,734		252	5,846		
S09 COUPLER FAILURE	**6**	**82,288**	**76,448**	**22**	**39,479**	**70,951**	4	**27,741**	**64,334**	32	**46,038**	23	**71,915**
S10 COMMUNICATION FAILURE	39	12,660	22,934	74	11,737	18,920	45	2,466	16,084	158	9,324	85	19,459
S11 DOOR FAILURE	**17**	**29,043**	**17,642**	**50**	**17,371**	**15,480**	27	**4,110**	**10,722**	94	**15,673**	111	**14,901**
S13 FRICTION BRAKE FAILURE	**9**	**54,859**	**30,579**	**23**	**37,762**	**23,650**	8	**13,870**	**21,445**	40	**36,831**	66	**25,061**
S14 HVAC FAILURE	**4**	**123,432**	**41,699**	**18**	**48,252**	**34,057**	16	**6,935**	**22,976**	38	**38,769**	50	**33,081**
S15 LIGHTING FAILURE	50	9,875		89	9,759		58	1,913		197	7,478		
S16 PROPULSION FAILURE	**6**	**82,288**	**38,224**	**30**	**28,951**	**28,381**	19	**5,840**	**14,621**	55	**26,786**	64	**25,844**
S17 SANDING SYSTEM FAILURE	2	246,865	152,896	8	108,567	141,903	1	110,963	107,223	11	133,930	12	137,837
S18 TRUCK EQUIPMENT FAILURE	8	61,716	23,644	6	144,756	19,800	3	36,988	14,621	17	86,660	84	19,598
S19 VANDALISM	23	21,466		43	20,198		10	11,096		76	19,385		
S21 BRIDGEPLT MECHANISM & CONTRL	**5**	**98,746**	**152,896**	**15**	**57,902**	**77,401**	0			20	**73,661**	14	**118,146**
S22 ELECTRICAL CONTROLS FAILURE	**1**	**493,729**	**458,688**	**1**	**868,534**	**425,708**	2	**55,482**	**321,670**	4	**368,307**	4	**413,510**
S23 CCTV/APC/EVENT RECORDER FAILS	8	61,716	229,344	4	217,134	212,854	1	110,963	160,835	13	113,325	8	206,755
TOTALS	257			555			285			1,097	1,343	595	
SERVICE RELATED MDBF	**63**	**7,837**	**5,050**	**181**	**4,799**	**4,598**	**92**	**1,206**	**3,330**	**336**	**4,385**	**379**	**4,364**

Total Mileage for:

Oct-Nov-Dec 2007

3 Month Mileage for Type 3 Rev Cars	=	493,729
3 Month Mileage for Type 2 Rev Cars	=	868,534
3 Month Mileage for Type 1 Rev Cars	=	110,963
3 Month Mileage for all Rev Cars	=	1,473,226 Total Miles

Appendix J

Contract Implementation Plan

This page left blank intentionally.

CONTRACT IMPLEMENTATION PLAN

PE Application

September 4, 2008

Columbia River CROSSING

Title VI

The Columbia River Crossing project team ensures full compliance with Title VI of the Civil Rights Act of 1964 by prohibiting discrimination against any person on the basis of race, color, national origin or sex in the provision of benefits and services resulting from its federally assisted programs and activities.

Americans with Disabilities Act (ADA) Information

If you would like copies of this document in an alternative format, please call the Columbia River Crossing project office at (360) 737-2726 or (503) 256-2726. Persons who are deaf or hard of hearing may contact CRC using Telecommunications Relay Service by dialing 7-1-1.

¿Habla usted español? La informacion en esta publicación se puede traducir para usted. Para solicitar los servicios de traducción favor de llamar al (503) 731-3490.

TABLE OF CONTENTS

This page left blank intentionally.

ACRONYMS

ADA	Americans with Disabilities Act
CRC	Columbia River Crossing
D/F/I	Design-Furnish-Install
FD	Final Design
FTA	Federal Transit Administration
LPA	Locally Preferred Alternative
LRT	Light Rail Transit
LRV	Light Rail Vehicles
OCS	Overhead Catenary System
PE	Preliminary Engineering
RFP	Request for Proposals
STHB	Stacked Transit/Highway Bridge
TES	Traction Electrification System
TVM	Ticket Vending Machines (TVMs)

This page left blank intentionally.

1. Introduction

The purpose of this plan is to describe the major procurements for the Preliminary Engineering (PE) phase through the Final Design phase of the transit portion of the Columbia River Crossing (CRC) project. The report examines in brief the preferred design contracting packages. Proposed construction packages and contracting methods will be determined during PE. Contracting approaches to the project as a whole, including all modes, including those not requesting 5309 New Starts funding, are under development under separate processes.

This report has been developed as part of the Columbia River Crossing Project's Request to Enter Preliminary Engineering. Because the project is early in its development cycle, the proposed contracting plan is preliminary in nature. During the project, the contracting plan discussed herein will be adjusted if necessary based on new information, such as technical requirements, industry comment, Federal Transit Administration (FTA) guidance, and risk management strategy. Any major changes to the plan, if necessary, will be documented through future plan revisions.

This page left blank intentionally.

2. Project Description

This section provides a basic overview of the overall project. Primary elements include:

- 2.9 miles of light rail extension to the existing MAX system;
- Five light rail stations (two of these stations include couplet (2) platforms);
- Three park-and-ride garages (2,900 parking spaces);
- Sixteen new light rail vehicles; and
- Expansion of the Ruby Junction Maintenance facility.

2.1 Alignment

2.1.1 The Locally Preferred Alternative

The Locally Preferred Alternative (LPA) will begin at the northernmost station of TriMet's current Yellow Line Expo Center Station. The LPA is a 2.9-mile light rail extension of the Yellow Line across the North Portland Harbor, across Hayden Island in Oregon, across the Columbia River, through downtown Vancouver, Washington, ending near Clark College. The following description of the alignment is broken into the three segments of Oregon, the river crossing, and Washington. The alignment is described beginning at Expo Center progressing northward to the end of construction at Clark College.

The light rail transit (LRT) alignment will extend northward from the existing stub end tracks at Expo Center Station. A double-track alignment including a northbound and southbound guideway will be constructed. The alignment will curve toward I-5 as it passes beneath a newly reconstructed Marine Drive as part of interchange reconstruction. North of Marine Drive the profile will rise over an existing dike as the guideway transitions onto a bridge structure to cross the North Columbia Harbor. The bridge curves to the northeast to bring the LRT alignment along the western edge and adjacent to the new I-5 improvements through Hayden Island. An LRT station will be constructed on Jantzen Beach. The alignment will extend northward on Hayden Island along the western edge of I-5 until it transitions onto the new Columbia River Bridge. The guideway will pass over several roads on Hayden Island including N. Jantzen Ave. and N. Hayden Island Dr. There are no at-grade road crossings in this segment. The length of this segment between the beginning of new construction at the existing Expo Center station and the beginning of the new Columbia River Bridge on the Oregon side of the river is approximately 0.7 miles.

The LRT guideway transitions from its own alignment onto a new combination highway and LRT bridge. The new Columbia River Crossing will consist of two parallel bridges. One bridge is designed for southbound highway traffic and both the northbound and southbound LRT. The other bridge will be designed to accommodate northbound highway traffic as well as bicycles and pedestrians. The new southbound bridge will have two levels with highway traffic on the upper level and light rail trains on a lower level. The profile for the new bridges is designed to provide enough vertical clearance above the river to permit barge and ship traffic to pass beneath without a lift or movable span. The length of the Columbia River Bridge is approximately 0.9 miles including approximately 0.5 miles over water and 0.4 miles in the approaches (0.2 miles on the Oregon side and 0.2 miles on the Washington Side).

After crossing the Columbia River on the joint highway/LRT bridge, the LRT alignment curves to the north out of the highway bridge and onto its own approach structure on the Washington side. The double-track guideway profile drops and is aligned to touch grade in Vancouver's Washington Street. The first cross street grade crossing will be at 5th Street. The double guideway alignment will head north to 7th Street where the northbound guideway will curve away from Washington St. and run two blocks east to Broadway where it will turn north into the right of way for Broadway St. The LRT alignment will then be aligned to form a couplet with the southbound guideway on Washington Street and the northbound guideway on Broadway St. The total length of double-track guideway between the Columbia River Bridge and the point where it becomes a couplet is approximately 0.2 miles.

The couplet will extend north from 7th Street running as a single-track guideway in the roadways of Broadway Street for northbound and Washington Street for the southbound LRT. The couplet arrangement will end after running 12 blocks north to McLoughlin Boulevard. There will be three station stops through downtown Vancouver: one between 5th and 6th on Washington, and two on the couplet segment in both Washington and Broadway streets at 11th-12th and at 15th-16th. The LRT alignment includes park-and-ride lots to serve the stations at both the southern and northern ends of the couplet alignment through Vancouver. The length of single-track guideway is approximately 0.6 miles in both Washington and Broadway Streets (1.3 miles of single guideway construction).

Another alignment option between 7th Street and McLoughlin Street is also being considered. This option includes a double track guideway on Washington street only instead of the couplet on Washington and Broadway.

Once entering the right-of-way of McLoughlin Street, both northbound and southbound alignments curve to the east with double-track guideway running east of Broadway Street in the median of McLoughlin Blvd. The double-track guideway alignment continues eastward approximately nine blocks crossing under I-5 and ending at a station in the center of McLoughlin Blvd. and east of I-5. This station is on the western boundary of Clark College and will include a park-and-ride lot. The length of double-track guideway in McLoughlin Street is approximately 0.6 miles.

From the segments described above, the total length includes 0.7 miles of double-track guideway in Oregon, 0.9 miles of bridge over the Columbia River, 0.9 miles of double-track guideway and 0.6 miles of couplet (1.3 miles of single-track guideway) in Vancouver. The total length of the alignment is approximately 2.9 miles.

2.2 Maintenance Facility

The project will require expansion of the existing Ruby Junction Maintenance Facility. Additional land adjacent to the existing facility will be acquired, and the facility will be expanded to provide additional vehicle storage, maintenance, and operational facilities. The design and construction will be coordinated to meet the needs of both the Columbia River Crossing and Portland to Milwaukie Light Rail projects.

2.3 Vehicles

The project includes a requirement for 16 light rail vehicles (LRV). The new vehicles will be very similar to the recently ordered “Type 4” LRVs for the TriMet I-205/Portland Mall LRT project. Differences may occur due to parts, manufacturer, technology advances, etc., but nearly all functional aspects are expected to be identical because the vehicles must be able to interoperate with TriMet’s existing fleet.

2.4 Current Project Status

The Columbia River Crossing project completed a Draft Environmental Impact Statement in May 2008. A Locally Preferred Alternative was determined July 22, 2008 (described above in Section 2.1.1). A New Starts submittal package is under development, and a formal request to enter Preliminary Engineering is being prepared and previewed, leading to an official submittal in early September 2008.

This page left blank intentionally.

3. Contract Packaging

This section discusses how the transit portion of the CRC Project will most likely be contracted. Due to the size, cost, and variation of the project elements, the transit portion of the project will most likely be divided into multiple, individual contracts. This section also provides more detail on the rationale for splitting the design of the transit portion of the Columbia River Crossing project into separate and distinct contracts. Numerous factors are considered when determining how to divide the work into contracting units. Among these factors are the type of work involved and geographic constraints. Similarly, market forces play a role in determining contract development. Market factors include availability of prime contractors, availability of specialty subcontractors, size of contract, and level of market activity.

The most notable item of work compared to previous LRT projects in the region is the Columbia River Bridge. This bridge will be designed and constructed by the Washington and Oregon state DOT's as part of the highway portion of the project. The transit elements of the bridge will be installed by a separate contractor, including track, Overhead Catenary System (OCS), signals, and all other necessary transit elements on the structure.

With these fundamental assumptions in mind, the proposed contract packages for the project are as follows:

3.1 Design

3.1.1 Preliminary Engineering

Preliminary Engineering for the Columbia River Crossing project will be a combined effort of the design staffs of WSDOT, ODOT, C-TRAN, TriMet, and the consultant team.

PE for the transit portion of the project will most likely be done using a single contract with the following scope:

- Civil, systems, infrastructure, and trackwork from the start of new construction at Expo Center to the new end of light rail at Clark College.
- Preliminary design of vehicles and maintenance facility modifications will be shared and coordinated with the Portland to Milwaukie Light Rail project.

This contracting arrangement will provide CRC with good flexibility in management of the preliminary design and efficiency in resource allocations between WSDOT, C-TRAN, ODOT, TriMet, and consultant staff.

Final Design (FD) will most likely be done using a single contract with the following scope:

- For the structural design of the Columbia River Bridge which will include all highway elements and provisions for light rail transit.
- For the balance of the civil, infrastructure, parking garages, and trackwork design.

- For design of operating systems (Traction Electrification System (TES), OCS, signals, and communications).
- For vehicle design and manufacturing oversight will be a shared effort with the Portland to Milwaukie Light Rail project.
- For design of the maintenance facility modifications will also be a shared effort with the Portland to Milwaukie Light Rail project.

For both PE and FD, all of the contracts will be subdivided into discrete scope-driven tasks, which will be managed by CRC staff.

3.2 Construction

CRC's plan for the transit construction contracting is primarily based on discrete geographic segments of the overall alignment. The track type, urban features, and neighborhoods change along the alignment, and these different combinations lead to natural separations in construction contracts. The anticipated cost of each contract is also on a magnitude that is appealing for large contractors typically pursuing light rail work, yet within a level where bonding capacity should be readily attainable.

The planned construction contracts are summarized below, beginning at the existing Expo light rail station and progressing north.

3.2.1 Segment A: Expo Station to the North End of the River Bridge

This segment encompasses the long aerial section over the North Portland Harbor and Hayden Island as well as the light rail facilities on the Columbia River Bridge. There will be a short segment of ballasted track construction between Expo Station and Marine Drive to connect to the existing tracks. All other light rail work will be on a structure and include direct fixation type track. There is one light rail station in this segment that will be on the structure over Hayden Island. Consistent coordination will be required with the Columbia River Bridge contractor who will turn the bridge over for construction of light rail track to the contractor of this segment. A light rail only structure that will curve out of the Columbia River Bridge on the north end to line the guideway into Washington Street in Vancouver will be part of this contract. The contract will end where the alignment matches grade in Washington Street and the track type changes from direct fixation on structure to embedded track in Washington Street.

3.2.2 Segment B: Downtown Vancouver

This segment includes primarily in-street embedded track construction in downtown Vancouver running north/south as single track in Broadway and Washington Street and east/west as double track in McLoughlin Blvd. There will be six station platforms in this segment. Two station platforms will be in double-track serving both north and southbound trains, the other four platforms will be single-track stations (two in Broadway and two in Washington St.). This segment is similar to the recently constructed Portland Mall project. Coordination with residents, businesses, and neighbors along the alignment will be paramount.

3.2.3 Other Major Contracts

Other anticipated major contracts include:

- Systemwide Traction Electrification, Signals, Communications, and central control. Because there will be multiple civil contracts, a single, systems-wide systems contract is preferred to ensure consistency and to provide CRC with direct control of the systems contractor.
- Maintenance Facilities Modifications shared cost with Milwaukie Light Rail project.
- Light Rail Vehicles: based on 16 vehicles.
- Parking Garages (three) under separate contracts: One or more garages could be combined into one contract.
- Smaller contracts for owner-furnished rail, ticket vending machines (TVMs), systemwide signage, shelters, furnishings, and other materials.

This page left blank intentionally.

4. Procurement Options

This section considers the primary options for selection and administration of the major contract packages to be procured.

4.1 Design

The main contractor for Preliminary Engineering has already been chosen under a competitive process. David Evans and Associates, and its subcontractors have been conducting conceptual design and will be working under a new set of tasks for Preliminary Engineering.

Options for selection of Final Design consultants will be determined during Preliminary Engineering.

4.2 Construction

Contracting methods for construction will be determined during PE. Because the work is located in both the states of Washington and Oregon, contracting methods will comply with the laws of the appropriate state.

This page left blank intentionally.

5. Procurement Summary

5.1 Preliminary Engineering

Contracts already solicited and awarded. Work to begin upon FTA approval to enter PE. All are procurements under the Brooks Act.

- One contract with the following scope:
  - Civil infrastructure, trackwork, and systems preliminary design,
  - Design contracts for vehicles and maintenance facility will be shared and coordinated with the Portland to Milwaukie Light Rail project for preliminary design.
  - A series of scope-specific tasks under indefinite delivery contracts for staff support and specialty designs.

5.2 Final Design

Contracts to be solicited and awarded in early 2010. Work to begin upon FTA approval to enter FD. All are procurements under the Brooks Act.

- One contract with the following scope:
  - For the structural design of the Colubmia River Bridge which will include all highway elements and provisions for light rail transit,
  - Civil, infrastructure, and trackwork for the light rail alignment.
  - Design of systems including signals, TES, OCS, communications, and operations modifications at Ruby Junction.
  - Design of the maintenance facility modifications (shared with Milwaukie project).
  - Design of the light rail vehicle (shared with Milwaukie project).
  - A series of scope-specific tasks under indefinite delivery contracts for staff support and specialty designs.

This page left blank intentionally.

Appendix K

Contingency Management Plan

This page left blank intentionally.

CONTINGENCY MANAGEMENT PLAN

PE Application

September 4, 2008

Columbia River CROSSING

Title VI

The Columbia River Crossing project team ensures full compliance with Title VI of the Civil Rights Act of 1964 by prohibiting discrimination against any person on the basis of race, color, national origin or sex in the provision of benefits and services resulting from its federally assisted programs and activities.

Americans with Disabilities Act (ADA) Information

If you would like copies of this document in an alternative format, please call the Columbia River Crossing project office at (360) 737-2726 or (503) 256-2726. Persons who are deaf or hard of hearing may contact CRC using Telecommunications Relay Service by dialing 7-1-1.

¿Habla usted español? La informacion en esta publicación se puede traducir para usted. Para solicitar los servicios de traducción favor de llamar al (503) 731-3490.

TABLE OF CONTENTS

List of Tables

This page left blank intentionally.

ACRONYMS

CCB	Change Control Board
CIP	Contract Implementation Plan
CRA	Cost Risk Assessment
CRC	Columbia River Crossing
CVEP	Cost Estimate Valuation Process
DEIS	Draft Environmental Impact Statement
FFGA	Full Funding Grant Agreement
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
LPA	Locally Preferred Alternative
NTE	not-to-exceed
PE	Preliminary Engineering
PMOC	Project Management Oversight Contractor
PMP	Project Management Plan

This page left blank intentionally.

1. Introduction

The purpose of this plan is to describe the development and management of contingency budgets included in the Columbia River Crossing Project. The report describes the basis of the contingency budget, evaluating the adequacy of that budget through risk analysis, and management of contingency during design and construction.

This report has been developed as part of the Columbia River Crossing Project (CRC) Request to Enter Preliminary Engineering for the light rail extension portion of the Project. The Project is early in the development cycle and the proposed Contingency Management Plan should be considered preliminary. During the Preliminary Engineering (PE) Phase, the project will acquire much more specific information about currently unknown conditions, and is also expected to undergo a formal risk analysis in conjunction with Federal Transit Administration (FTA) and the Project Management Oversight Contractor (PMOC). The Contingency Plan will be updated to reflect additional information arising from those efforts.

This page left blank intentionally.

2. Project Description

This section provides a basic overview of the overall project. Primary elements include:

- 2.9 miles of light rail extension to the existing TriMet MAX system.
- Five light rail stations (includes two stations in single track couplet).
- Three proposed park-and-ride structures.
- Sixteen new light rail vehicles.
- Expansion of the TriMet Ruby Junction Maintenance facility.

Further details of the alignment and the overall project scope are described in other materials in support of the Request to Enter PE, including the Contract Implementation Plan (CIP) and various management plans.

2.1 Current Project Status

The CRC has completed a Draft Environmental Impact Statement (DEIS) and a Locally Preferred Alternative (LPA) was adopted by project sponsors in July 2008. A New Starts package and a formal request to enter PE are being prepared for submittal to FTA.

This page left blank intentionally.

3. Contingency Budget

This section discusses the methodology used by the Project. For the PE estimate, the Project adopted the methodology used by TriMet to build-up contingency, but with a few specific exceptions to reflect that the design is at a pre-PE point of development and based on recent FTA guidance and input.

Note that all the project elements and project cost are not known with certainty until after the project has been completed. In addition, experience has shown that there is a tendency for the project scope to expand to meet unanticipated requirements placed upon the project by regulatory agencies.

Contingency is computed in two components:

3.1 Allocated Contingency

The CRC Project's LRT estimate includes additional contingency that is embedded within the line item costs. This embedded, or allocated, contingency is retained in the subject cost category and reported as cost in the CRC estimate summary. It stays "attached" to the particular line item for budgeting purposes so that it is permanently linked to that item rather than made available to the overall project's unallocated contingency. These contingencies are shown in the Standard Cost Category Main Build and Baseline Worksheet as allocated contingencies.

Contingencies are added on a line-by-line basis to each individual cost element rather than as an unallocated contingency (FTA Category 90). The Project adopted the TriMet methodology for estimating contingencies to ensure consistency with the Portland-Milwaukie Light Rail project and draw upon TriMet's experience with building light rail in the region. Two categories, "Utility Relocation" and "Special Conditions", were increased for the CRC Project to account for anticipated differences in site conditions. The percentage contingencies take into account elements such as the level of engineering and the complexity of design elements (for example, bridges or tunnels).

Table 3-1. Contingencies

TriMet Contingency Categories	Contingency	Equivalent FTA SCC Categories
Right-of-Way	25.0 %	60 – ROW, Land & Existing Improvements
Utility Relocation	50.0 %	40 – Sitework & Special Conditions
Street Construction	25.0 %	40 – Sitework & Special Conditions
Track Grade Construction	25.0 %	10 – Guideway & Track Elements
Structures	25.0 %	10 – Guideway & Track Elements
Stations	20.0 %	20 – Stations, Stops, Terminals & Intermodal
Park and Rides	20.0 %	20 – Stations, Stops, Terminals & Intermodal
Road Crossing	20.0 %	40 – Sitework & Special Conditions
Track Installation and Materials	20.0 %	10 – Guideway & Track Elements
Special Conditions	50.0 %	40 – Sitework & Special Conditions
Fare Collection	15.0 %	50 – Systems
Track electrification system	20.0 %	50 – Systems
Signals	20.0 %	50 – Systems
Communications	20.0 %	50 – Systems
Light rail vehicles	10.0 %	70 – Vehicles
Operations and Maintenance Facility	25.0 %	30 – Support Facilities: Yards, Shops & Admin. Buildings
Professional Services	15.0 %	80 – Professional Services

Over the course of multiple projects, TriMet has developed 19 capital cost categories which, based on the agency's experience, have consistent contingencies; that is, the same contingency may be applied to all cost elements within the same category. An additional contingency for professional services (such as engineering, administration and construction management) was added for the CRC project.

3.2 Unallocated Contingency

In addition to the above activity-specific percentages, the estimate ***also includes unallocated contingency*** to reflect that the project is at the pre-PE point of development. This percentage is applied to the total construction cost.

The total amount of unallocated contingency generated from the above calculation is reported as "Unallocated Contingencies" on the Project's Capital Cost Estimate Summary. It is also shown as unallocated contingency Category 90 on the FTA Standard Cost Categories Main Build Worksheet.

4. Contingency Validation

During the PE Phase, Project staff will participate in a formal risk analysis on the Project to test the adequacy of the contingency budget. The risk analysis is anticipated to be done by or in conjunction with FTA, Federal Highway Administration (FWHA), and the PMOC. CRC will also retain its own risk expert to assist during the risk analysis process and throughout the implementation of the Project.

The specific requirements of the risk assessment are not fully known at this time, but the intent of the analysis will be to determine whether the contingency level is likely to be sufficient and to identify the major project risks in order to facilitate tracking, management, and mitigation of these risks during design and construction. As a result of the analysis, the overall contingency amount may be adjusted, or specific mitigation actions may be defined to offset any potential contingency requirements in excess of the contingency budget.

A 25% contingency is applied to all bridge costs including the main river crossing. Section 2.2.3 of the Basis of Capital Cost Estimate describes the engineering work performed on the main river bridge used as a basis for the cost estimate.

CRC conducted a Cost Risk Assessment (CRA) Workshop on July 24, 2007 and a report from the workshop was dated December 7, 2007. A risk register including highway and transit risks is included in this report.

This list is certainly not a complete listing of all Project risks. The list will be expanded as project development continues, and additional risks will be added based on staff observations, new conditions, FTA, FHWA, and PMOC advice, and stakeholder input.

This page left blank intentionally.

5. Contingency Management

Overall Project contingency will be finalized in the Full Funding Grant Agreement (FFGA). Guided by CRC management, the Project will have lead responsibility for managing contingency. A not-to-exceed (NTE) contingency amount will be authorized for each specific contract at the time the contract package is awarded or approved. The approved amount will be based on the type of work undertaken in the contract and other risk factors. Contract Managers are tasked with managing the contract to the authorized amount. Use of authorized contingency must also follow delegated authority limits, as fully defined in the Project Management Plan (PMP).

The CRC Management and Project managers will collaborate to monitor contingency need monthly via the cost-to-complete projections, which are compared to available contingency remaining. Pre-defined mitigation actions may be exercised in cases when projected contingency needs exceed available contingency.

Finally, newly emerging contingency management policies by FTA may become applicable to the Project. Any such requirements will be defined by FTA during the New Starts/FFGA approval process. CRC will adjust the contingency management processes discussed herein as necessary to meet any new FTA policies in this regard.

This page left blank intentionally.

Appendix L

Safety and Security Management Plan

This page left blank intentionally.

SAFETY AND SECURITY MANAGEMENT PLAN

PE Application

September 4, 2008

Columbia River CROSSING

Title VI

The Columbia River Crossing project team ensures full compliance with Title VI of the Civil Rights Act of 1964 by prohibiting discrimination against any person on the basis of race, color, national origin or sex in the provision of benefits and services resulting from its federally assisted programs and activities.

Americans with Disabilities Act (ADA) Information

If you would like copies of this document in an alternative format, please call the Columbia River Crossing project office at (360) 737-2726 or (503) 256-2726. Persons who are deaf or hard of hearing may contact CRC using Telecommunications Relay Service by dialing 7-1-1.

¿Habla usted español? La informacion en esta publicación se puede traducir para usted. Para solicitar los servicios de traducción favor de llamar al (503) 731-3490.

TABLE OF CONTENTS

List of Figures

List of Tables

This page left blank intentionally.

ACRONYMS

ANSI	American National Standards Institute
APTA	American Public Transportation Association
AREMA	American Railway Engineering and Maintenance of Way Association
CCTV	Closed Circuit Television
CFR	Code of Federal Regulation
CIL	Certifiable Items List
CPTED	Crime Prevention Through Environmental Design
CRC	Columbia River Crossing
C-TRAN	Clark County Public Transportation Benefit Area
FFGA	Full Funding Grant Agreement
FTA	Federal Transit Administration
ITM	Integration Test Manager
NFPA	National Fire Protection Association
OAR	Oregon Administrative Rule
OCIP	Owner Controlled Insurance Programs
ODOT	Oregon Department of Transportation
OR-OSHA	Oregon Occupational Safety and Health Administration
PDOT	Portland Department of Transportation
PHA	Preliminary Hazard Analysis
PMOC	Project Management Oversight Consultant
PMP	Project Management Plan
RE	Resident Engineer
SEPP	Security and Emergency Preparedness Plan
SSC	Safety and Security Committee
SSCC	Safety and Security Certification Committee
SSCP	Safety and Security Certification Program

SSI	Sensitive Security Information
SSMP	Safety and Security Management Plan
SSO	State Safety Oversight
SSPP	System Safety Program Plan
TriMet	Tri-County Metropolitan Transportation District
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety and Health Act
WSDOT	Washington State Department of Transportation

Columbia River Crossing Project Team Safety and Security Policy Statement

The Columbia River Crossing Project Safety and Security Team (SST) for the Light Rail Transit (LRT) component of the project, is made up of staff from both C-TRAN and TriMet as well as local law enforcement in both Portland, Oregon and Vancouver, Washington. Together the project team will strive to build a safe, secure, comfortable, reliable, and innovative project that will deliver transportation options to our growing region. Safety and security is a value that affects all levels of the CRC Project activities, including planning, design, construction, testing, and operations. All CRC Project personnel and contractors are charged with the responsibility of ensuring the safety of all C-TRAN and TriMet customers, employees, and property.

The CRC Project SST is empowered and authorized to develop, implement, and administer a comprehensive, integrated, and coordinated System Safety Program that identifies, prevents, and controls hazardous conditions affecting CRC Project resources and customers. This commitment to safety and security begins at the planning, design, construction, testing, and start-up phases of the CRC Project. All CRC Project engineering, operations, security and safety staff, project consultants, and construction firms are charged with the responsibility for ensuring the safety and security of customers, CRC Project Team employees, and the general public who come in contact with the CRC Project.

The TriMet Director of Operations Support is responsible for TriMet Safety and Security and is delegated the authority and responsibility to implement the Safety and Security Management Plan (SSMP), a component of the CRC Project Management Plan, in collaboration with the Deputy Project Director of Safety and Security, C-TRAN'S Director of Operations. Furthermore, all CRC Project staff assigned to the LRT component of the project, including consultants and construction personnel, are directed to comply with the provisions of the CRC Project and to fully cooperate in achieving both C-TRAN and TriMet's goal for safe and secure transit.

The SSMP lays out the strategies and describes the integration of safety and security activities for an effective safety and security program designed to reduce the potential for accident/incident(s) and increase the efficiency of operations. The SSMP describes the methods for identifying and resolving hazards and vulnerabilities pertaining to the light rail component of the CRC Project, its customers and those who come in contact with it. It establishes accountability for safety and security and outlines policies and goals throughout the organization and parties responsible for operating and maintaining the CRC Project.

Fred Hansen TriMet General Manager	Jeff Hamm C-TRAN CEO/Executive Director

This page left blank intentionally.

1. Management, Commitment, and Philosophy

1.1 Introduction

The Federal Transit Administration (FTA) requires the development and implementation of a Safety and Security Management Plan (SSMP) specific to capital projects under Full Funding Grant Agreements (FFGA). This requirement is described in FTA Circular 5200.1A, Chapter II, Section 6, dated December 5, 2002 and the FTA Guidelines for Safety and Security Management Plans – draft dated January 5, 2002. This document fulfills this requirement for the transit component of the Columbia River Crossing Project.

The SSMP is a component of the CRC Project Management Plan (PMP) and formalizes the technical and management strategies for determining safety and security risk acceptance throughout the CRC Project cycle, up to revenue service. The SSMP provides guidance for the identification, evaluation, and resolution of safety hazards and security vulnerabilities associated with the operation of the transit component of the CRC Project. This process helps achieve the CRC Project Team's commitment to ensuring that safety and security are intrinsic to the project and to all agency(s) operations.

For the CRC light rail extension portion of the CRC Project, WSDOT is the designated FTA grantee. However, project partner TriMet will provide much of the expertise for light rail construction and both TriMet and C-TRAN will lead the implementation of the service. Therefore, this document focuses on TriMet and C-TRAN, as the agencies ultimately responsible for safety and security after service begins and the leads, in partnership with WSDOT, for safety and security during construction.

The SSMP also lays the foundation for follow-on safety and security activities after the start of the new light rail service. These activities will be in compliance with the Oregon Department of Transportation (ODOT) and the Washington Department of Transportation (WSDOT) which in addition to being CRC co-managers and project partners have oversight and regulatory authority over the CRC Project safety and security requirements. The safety activities are detailed in both C-TRAN and TriMet's System Safety Program Plan (SSPP), which is updated annually.

The CRC Project is a bi-state project encompassing areas that are served by two transit districts. The project team will comply with all applicable Oregon and Washington state laws as well as all applicable rules and regulations within the City of Portland, the City of Vancouver, C-TRAN, and TriMet.

1.2 Purpose of the Safety and Security Management Plan

The purpose of the SSMP is to provide a blueprint for the CRC Project Safety and Security Team (SST)'s approach to managing safety and security risks throughout all phases of the LRT component of the CRC Project. It defines the safety and security activities and methods for identifying, evaluating, and resolving potential safety hazards and security vulnerabilities of the CRC Project, and establishes responsibility and accountability for safety and security during each phase - preliminary engineering through start-up - of the CRC Project. The SSMP:

- States CRC Project SST's commitment and philosophy to achieve the highest practical level of safety and security for C-TRAN and TriMet customers, employees, and the public that comes in contact with it.
- Establishes and manages safety and security activities intended to minimize risk of injury and property damage, and to maximize the safety and security for C-TRAN and TriMet customers and the public that come in contact with it.
- Integrates the safety and security functions and activities throughout C-TRAN and TriMet's organizational structure and activities.
- Defines the safety and security responsibilities of CRC Project personnel assigned to the LRT component of the project.
- Provides for the documentation and verification of safety and security activities.
- Evaluates activities to assure continued development and advancement of safety and security.
- Establishes the framework for construction safety and security.

1.3 Scope of the Safety and Security Management Plan

The scope of the SSMP is comprehensive. It covers all project developmental activities from preliminary engineering, to final design, construction, acceptance testing, and start-up, up to revenue operations. The SSMP also encompasses the equipment, operating and maintenance plans, facilities, and procedures for the following:

- **Systemwide Elements:** includes the passenger vehicles, train control system, voice and data communications, closed circuit television (CCTV), grade crossing and traffic control system, central instrument houses, track, fare collection, supervisory control, traction power, overhead catenary system, fire protection and suppression systems, and auxiliary vehicles and equipment.
- **Fixed Facilities:** includes stations, park-and-ride facilities, yard and shop, structures, and the operations control center. Equipment installed in stations stops such as lighting is considered part of the facility.
- **Safety, Security, System Assurance, and Maintenance Plans and Procedures:** includes Emergency Preparedness Plan, Training Programs, Accident/Incident Investigation, Reporting Procedures, Rulebook and Standard Operating Procedures.

1.4 Safety and Security Management Plan Goals

The goals of the SSMP are to achieve an acceptable level of risk through a systematic approach to hazard and threat/vulnerability management for transit component of the CRC Project and to establish a proactive Construction Safety and Security Program that achieves zero accidents for employees and to the public and minimizes construction related security breaches.

This SSMP goal will be accomplished through the following:

- Clear determination regarding acceptable safety and security risks.
- Verification that an acceptable level of safety and security is designed into the transit component of the CRC Project.
- Consistent evaluation of safety and security risk throughout the project development process.
- Consistent application of safety and security certification to support initiation of the project into revenue service.

1.5 Safety and Security Management Plan Objectives

The objectives of the SSMP are to provide effective management for a process that applies the system safety and security discipline to the transit component of the CRC Project development effort, ensuring a project approach, which, at a minimum:

- Provides mechanisms for the formal identification, consideration, elimination or control of hazards and vulnerabilities to passengers, employees, contractors, emergency responders, and the general public.
- Verifies that appropriate codes, guidelines, and standards have been reviewed to provide a basis for safety and security considerations in the design criteria and that design criteria checklists have been developed and implemented to document this review.
- Verifies that appropriate specifications and drawings are in conformance with the design criteria and that specification conformance checklists have been appropriately developed, completed, and certified to document design conformance.
- Verifies that contract deliverables (facilities, systems, and equipment) are reviewed against the contract specifications and drawings (including all engineering changes) for compliance with codes, guidelines, and testing requirements and that all appropriate checklists have been developed, implemented, and certified to document compliance.
- Verifies operations simulations and safety plans, safety-related operating and maintenance procedures and training, and rule book are developed and implemented to ensure safe and secure revenue service.
- Verifies emergency preparedness and readiness for the project initiated into revenue service.
- Provides for the implementation of a construction safety and security program in conformance with the TriMet Construction Safety Program document and construction security requirements.
- Verifies compliance with Oregon OSHA (OR-OSHA) and Washington WISHA construction regulations.

1.6 Safety and Security Management Plan Review and Updates

The CRC Project Safety and Security Committee will review the SSMP at least annually, whenever the PMP or other reference documents are modified, or following SSMP audits to ensure safety and security aspects remain addressed. The SSMP will be updated to reflect changes to these documents or changes to the safety and security program, and re-issued to all SSMP recipients. The review and update process is the responsibility of the TriMet Director of Operations Support, in conjunction with the C-TRAN Deputy Project Director. The Safety and Security Committee is responsible for approving revisions to the SSMP.

2. Integration of Safety and Security into the Project Development Process

2.1 Project Team

The CRC Project team consists of TriMet Capital Projects Division engineering, design, construction, and management personnel; TriMet and C-TRAN Operations Divisions; TriMet and C-TRAN Safety and Security personnel and project design consultants that provide specialized technical services.

2.2 Procedures

A Project Management Plan (PMP) for the transit component of the CRC Project was prepared and distributed to all project participants. The PMP:

- Establishes the framework for managing and administering all activities related to the implementation of the CRC Project.
- Outlines the management processes and organizational structure for the transit component of the CRC Project.
- Provides guidance for the coordination of CRC Project activities.

A major activity within the PMP is the safety and security management of identified safety hazards and security threats and vulnerabilities. It is the responsibility of both TriMet and C-TRAN, serving as the CRC Project Safety and Security Team (CRC Project SST) to see that these activities are effective and integrated throughout the design, construction, testing, and start-up phases of the transit component of the CRC Project.

CRC Project SST involvement in the safety and security management process begins during design and continues through the construction, testing, and start-up phases. Specific processes have been developed to assure the requirements of the SSMP are performed, including but not limited to the performance of safety analyses and security assessments at the appropriate phases of the project, implementation of a Safety and Security Certification Program (SSCP) from the start of project activities, and a process to ensure safety issues and security concerns are addressed and tracked to resolution. To ensure these and other safety and security activities are performed effectively and within the requirements of the CRC Project, periodic audits are performed by TriMet security and safety staff, or by consultant services. In addition, due to the bi-state nature of the project C-TRAN may similarly perform or participate in audits as deemed necessary. These audits are planned on an annual basis, but audit topics may change as necessary.

The extent of the audits will cover items listed in the Schedule of Activities listed in section 8.11 of the SSMP. Not all activities will be covered in each audit; however, construction activities related to the activities in the list will be taken into account to ensure the proper activities are being audited during that phase of the project.

Procedures have been established for the protection of project information that is considered and marked as Sensitive Security Information (SSI). This process will be managed by the TriMet security and safety staff and is reviewed and adjusted on an ongoing basis. TriMet's Director of Operations Support and C-TRAN's Director of Operations will jointly classify SSI documents related to the CRC Project.

2.3 Resources

The TriMet Director of Operations Support is assigned the task for overall administration of the SSMP. The Director of Operations Support is supported by TriMet and C-TRAN Safety and Security staff and by safety/security consultant services, as required. The level of consultant services is dependent on the particular needs of the CRC Project.

2.4 Senior Management Interface

The Columbia River Crossing Safety and Security Committee (SSC) is the forum for formal discussion of safety and security issues. The committee is comprised of CRC Project staff, TriMet and C-TRAN Safety and Security, TriMet and C-TRAN Operations and TriMet and C-TRAN Legal. Representatives from other jurisdictions inside and outside of TriMet and C-TRAN also participate as needed. Meeting minutes are documented and resolution of issues at the committee level is the goal. In the event that safety and security issues cannot be resolved at the committee level, the issue is brought to the TriMet General Manager for resolution in collaboration with C-TRAN CEO/Executive Director. The direction and decision of the TriMet General Manager will be forwarded to the CRC Project Safety and Security Committee for implementation.

2.5 Integrated Safety and Security Tasks Matrix by Project Phase

The following matrix illustrates the specific safety and security tasks by each phase of the CRC Project.

Table 2-1. Safety Activities Matrix

Safety Activities	Preliminary Design	Final Design	Construction	Testing and Evaluation	Start-up
Program Management Plan	X	X			
Safety and Security Management Plan	X	X			
Safety Certification	X	X	X	X	X
Plan	X				
Certifiable Elements and Items List	X	X			
Conformance Checklists	X	X	X	X	X
Deviations and Work-arounds		X	X	X	X
Certificates of Conformance		X	X	X	X
System Certificate					X
Certification Report					X
Safety Policy and Schedule Control	X	X	X		
Design Criteria	X	X			
Technical Specifications	X	X			
Codes, Regulations, Standards	X	X	X		
Hazard List	X	X	X		
Hazard Analyses (Peer Review)	X	X (as needed)	X (as needed)		
Design Reviews	X	X	X		
Specification and Integration Tests Plan					
Plan		X			
Conduct			X	X	X
Safety Training					
Plan		X	X		
Manuals			X		X
Conduct					X
Rules and Standard and Emergency Operating Procedures				X	X
Operational Simulations					
Normal					X
Abnormal					X
Emergency Drills					X

Table 2-2. Security Activities Matrix

Security Activities	Preliminary Design	Final Design	Construction	Testing and Evaluation	Start-up
Program Management Plan	X	X			
Safety and Security Management Plan	X	X			
Security Certification	X	X	X	X	X
Plan	X	X			
Certifiable Elements and Items List	X	X			
Conformance Checklists	X	X	X	X	X
Deviations and Work-arounds		X	X	X	X
Certificates of Conformance		X	X	X	X
System Certificate					X
Certification Report					X
Security Policy and Schedule Control	X	X	X	X	X
Design Criteria	X	X			
Technical Specifications	X	X			
Codes, Regulations, Standards	X	X	X		
Threats and Vulnerabilities List	X	X	X		
Threat, Vulnerability, and Consequence Analyses (Peer Review)	X	X (as needed)	X (as needed)		
Design Reviews	X	X	X		
Specification and Integration Tests Plan					
Plan		X			
Conduct			X	X	X
Security Training					
Plan		X	X		
Manuals			X		X
Conduct					X
Rules and Standard and Emergency Operating Procedures				X	X

Security Activities	Preliminary Design	Final Design	Construction	Testing and Evaluation	Start-up
Operational Simulations					
Normal					X
Abnormal					X
Emergency Drills					X

This page left blank intentionally.

3. Assignment of Safety and Security Responsibilities

3.1 Responsibility and Authority for SSMP

TriMet's General Manager has assigned the responsibility and authority for the development and management of the SSMP to the TriMet Director of Operations Support who is responsible for TriMet Safety and Security in conjunction with C-TRAN's Director of Operations. Both TriMet and C-TRAN have integrated safety and security responsibilities into a single department in order to demonstrate their commitment to the process and to highlight the priority of safety and security within both agencies as well as the CRC Project.

The TriMet Director of Operations Support is the focal point for the safety and security effort for the CRC Project. In addition to the Director of Operations Support, a TriMet Senior Safety Specialist provides technical support. (A C-TRAN Senior Safety Specialist may also be provided dependant upon the needs of the project). This position has been assigned to the CRC Project on a full time basis. The role of the Senior Safety specialist is to assist the Director of Operations Support and the project management team in the fulfillment of the SSMP. As activities warrant, additional safety and security staff may be utilized or safety/security consultant services obtained.

The CRC Project SST's management philosophy is to use the Safety and Security Department for program and project leadership, policy recommendations, planning, analysis, and oversight. However, the functions of safety and security are viewed as intrinsic to the responsibility of each department and ultimately the responsibility of each employee. As detailed in the Safety and Security Tasks Matrix in Section 3.6 of this SSMP, all departments and organizations that have a role in the transit component of the CRC Project have specific project responsibilities and accountabilities. CRC Project staff will receive safety and security training in order to successfully carry out their safety and security responsibilities. This integrated approach to safety and security provides the project with professional and well-trained resources at all levels of the organization during all phases of the project.

3.2 Approach to Safety Responsibilities

The TriMet Director of Operations Support reports to the Executive Director of Capital Projects and Facilities for project direction until project closeout, and to the TriMet General Manager and Executive Director of Operations for policy direction. The Director of Operations Support is the key contact and coordination point for the performance of all safety activities identified in the CRC Project SSMP. The Senior Safety Specialist (s) who is assigned to the CRC Project assists the Director of Operations Support.

The Director of Operations Support or designee, has the following CRC Project responsibilities as they relate to the SSMP:

- Manages the Safety and Security program.
- Coordinates the system safety effort with systems engineering, civil engineering, quality assurance, integration and testing, program management functions, and the CRC Project SSC.
- Assists in the identification of necessary technical safety criteria and requirements (including those associated with interfacing hardware, software, and facilities) and ensures their incorporation into designs, specifications, and planning documents.
- Ensures that submitted hazard reports contain sufficient information to permit the Project Director and the CRC Project SSC to make informed decisions and recommendations.
- Reviews system safety tasks, prioritizes safety risks, and recommends engineering, procedural, or other changes necessary to reduce the safety risk to an acceptable level.
- Ensures the implementation, documentation, and tracking of all hazards from identification through resolution.
- Works with Project Delivery/Engineering Support Director to review and approve contractor construction safety plans CRC Project and overall site safety plans where approved by the SSC.
- Ensures the Fire Life Safety Committee is addressing concerns, recommending engineering or procedural changes.
- Participates in all major design reviews, and provides the following:
  - Lists of preliminary hazards and other safety concerns.
  - Completed hazard analyses appropriate to the level-of-design detail.
- Provide recommendations for corrective actions and controls, based on hazard analysis and sound engineering and management principles.
- Develop reports and documents ongoing safety activities and concerns.
- Participates in all major activities to review and accept the delivered project, system, sub-system or component, and provides a safety assessment and a safety certification package, with any exceptions documented.
- Participates in all major activities to “review” the delivered project and initiate revenue service, and provides a safety assessment and a safety certification package for operational readiness, with any exceptions documented.
- Maintains safety oversight of the project tests, operations, or activities at a level consistent with the potential for loss over the life of the system to:
  - Ensure that, in all instances, hazards are controlled or eliminated by corrective action with the following priorities:
    - Eliminate hazardous subsystems within the design.
    - Minimize or negate the effects of hazards through design techniques.

    - Install safety devices.
    - Install caution and warning devices.
    - Develop administrative controls, including special procedure.
    - Provide protective clothing and equipment.
- Ensures that contractors and others supporting the project prepare a plan to address hazard analysis and resolution in their activities, which must be approved by the Project Manager and the CRC Project Safety and Security Committee.
- Submits formal Hazard Reports and other documents for each hazard or safety issue with a residual risk to be formally accepted by management prior to contractual acceptance.

3.3 Approach to Security Responsibilities

The TriMet Director of Operations Support reports to the Executive Director of Capital Projects and Facilities for project direction until project closeout, and to the TriMet General Manager and Executive Director of Operations for policy direction. The Director of Operations Support is the key contact and coordination point for the performance of all security activities identified in the CRC Project SSMP. In this capacity, the Director of Operations Support has the following security responsibilities:

- Chairs the CRC Project SSC, which meets to manage and oversee threat and vulnerability assessment and other security issues for the project.
- Provides the General Manager, Project Manager and the CRC Project SSC with assessments and briefings regarding security threats and vulnerabilities, technology and design evaluations, security mitigation strategies, personnel requirements, and recommended counter-measures.
- Attends the Fire Life Safety and Security Committee meeting, reviews and management meetings on project development, acceptance, operational readiness, and emergency preparedness.
- Assists in the reviews of design criteria, conceptual design alternatives, preliminary drawings and technology to provide security evaluations and recommendations.
- Reviews new security requirements and activities required to support design, construction, acceptance, and operation of the CRC Project.
- Develops security related implementation strategies for the review and approval of the CRC Project SSC.
- Develops schedules and resource allocation for implementation of new security activities.
- Considers security aspects of facilities, systems, and vehicles; proposes patrol strategies and security management systems.
- Plans fiscal requirements of security activities.
- Consider the security of passengers, employees, first responders, vehicles, and facilities in design and operational reviews.

- Coordinates strategies with the Transit Police Division and Local Police Jurisdictions.
- Determines training needs and drills for security related activates.
- Reviews SSMP, SSPP, and the Security and Emergency Preparedness Plan (SEPP).
- Develops resolutions for identified security problems.
- Determines, in consultation with the Transit Police Division and Vancouver Police Department, security equipment needs.
- Meets with local police and other public safety organizations on an ongoing basis.
- Reviews the success of the CRC Project SSC.
- Collaborates with the Deputy Project Director of Safety and Security, C-TRAN's Director of Operations, on all security issues that directly or indirectly impact C-TRAN and solicits input from employees of TriMet, C-TRAN, Transit Police, City of Vancouver Police, and other first responders for improving security.

3.4 Responsibilities of Key Project Personnel

The following is a list of key personnel at TriMet. Given the nature of this project it is understood that a high level of collaboration will be required during design, construction, and implementation.

3.4.1 Executive Director, Capital Projects and Facilities Division

The TriMet Executive Director has final responsibility for the CRC Project. He/she prioritizes and obligates resources needed for successful completion of the project. This position reports to the TriMet General Manager.

3.4.2 Capital Construction Programs Director

The Capital Construction Programs Director has primary responsibility for the CRC Project. He/she prioritizes and obligates division resources needed for the successful completion of the Project. He/she represents the Project to outside agencies and interests including the Federal Transit Administration, the U.S. Department of Transportation, state governments, and local governments. He/she has executive level role in negotiations/dispute resolution with contractors. He/she is a member of the Contract Control Board. This position reports to the Executive Director, Capital Projects.

3.4.3 Columbia River Crossing Transit Engineering Manager

The Transit Engineering Manager is responsible for day-to-day coordination of all activities related to the LRT component of the CRC Project. The Transit Engineering Manager ensures integration and coordination between dedicated project staff, ODOT, WSDOT, and local jurisdiction efforts, consultants and supporting division personnel. This position defines project objectives and monitor work plans for all activities needed for successful completion of the project, including engineering, project control, construction management, safety and security and community relations. The Transit Engineering Manager reports to the Project Director, and collaborates with the Executive Director, Capital Projects and Facilities Division.

3.4.4 CRC Light Rail Design Contract Managers

The Contract Managers manage the final design contracts, including issuance of task orders and adherence to scope, schedule, and budget objectives, coordinate the activities of matrixed staff resources to resolve issues and ensure technical compliance with agency requirements and ensure safety and security issues are addressed in designs. These positions report to the Transit Engineering Manager.

3.4.5 CRC Rail Resident Engineers

During the final design phase, Resident Engineers (REs) participate in developing specifications and special provisions and reviewing the design drawings.

During the construction phase, Resident Engineers have the authority to and responsibility for enforcing contract provisions, including construction safety and security provisions.

3.4.6 Light Rail Vehicle Contract Manager

This position manages the Vehicle contract, including contract requirements, issuance of task orders and adherence to scope, schedule and budget objectives. He/she manages all engineering aspects of the operating system's elements of the project. This position reports to the Project Director.

3.4.7 Program Management Director

The Program Management Director manages the performance of CRC Project staff, assigned to the LRT component of the project, who have responsibility to manage the project's master schedule, budget, grant administration, risk management, cost control, monitoring and reporting, change control and claims administration. He/she administers the Contract Control Board, establishes and tracks data for Project status reports, and oversees risk management mitigation plan. He/she implements and monitors processes for claims management, value engineering, and quality assurance. This position reports to the Executive Director, Capital Projects and Facilities Division.

3.4.8 Project Delivery/Engineering Support Director

The Project Delivery/Engineering Support Director manages the performance of TriMet staff that has responsibility to support all projects with engineering resources. He/She manages the construction safety program, and its interface with Operations Division, and is responsible for the implementation and execution of the safety certification process. He/she is also responsible for managing the quality assurance staff and program. He/she assists in developing plans and procedures for readiness, coordinates with the Systems Engineering Director, Operations Division, and the Operations Support Director for safety certification, test, and startup. He/she develops and monitors processes for standardization among projects and monitors internal adherence to plans and procedures. He/she is responsible for coordination with the Project

Management Oversight Consultant (PMOC), and is a member of the Contract Control Board. This position reports to the Executive Director, Capital Projects and Facilities Division.

3.5 CRC Project – Safety and Security Committee

The CRC Project SSC will be established and will oversee all safety and security elements of the LRT component of the CRC Project. This committee will be active throughout the startup of the CRC Project. This committee will be the main avenue for addressing safety and security issues on the CRC Project. The committee will be responsible for reviewing designs, providing comments on items like CCTV placement, operating concerns, maintenance issues, in addition to an array of other safety critical items. Comments from the SSC will be incorporated into the design of the project, and topics discussed at the meetings will be tracked through completion.

The SSC will also be responsible for overseeing the management of the Safety and Security Certification Program. The primary body responsible for overall management of safety and security certification process of a new project is the SSC. The certification process will follow the steps outlined in the Systems Safety Program Plan, the Security and Emergency Preparedness Plan, and the detailed Safety and Security Certification Plan for the LRT component of the CRC Project. The SSC is responsible for coordination with the wide array of technical specialties necessary to ensure that a comprehensive and complete approach has been developed for all activities related to safety and security certification.

The SSC is composed of the following:

- TriMet Director of Operations Support (Safety and Security) (Chair)
- C-TRAN Director of Operations (Vice Chair)
- C-TRAN Field Operations Manager (Safety and Security)
- TriMet Manager of System Safety
- Director of Project Delivery/Engineering Support
- CRC Project Senior System Safety Specialist
- Project Transit Engineering Manager
- Design Contract Managers
- Resident Engineers
- Manager, Systems Engineering
- Test Program Coordinator
- Operations and Fire/Life Safety and Security Committee Liaison
- Observers: PMOC, SSO, Legal staff

It is the responsibility of the CRC Project SSC to oversee the timely development and completion of the various lists in both the design and construction phases. As integrated testing commences the status of the construction conformance checklist becomes more critical and the SSC's oversight is instrumental in ensuring the Coordinated Test Plan can be completed.

Elements not yet certified will be tracked on an open-items list and work-arounds may need to be approved by the SSC for some tests to proceed. The SSC also approves work-arounds necessary to beginning revenue service.

The principal duties of the SSC as they relate to Safety and Security Certification are to:

- Assist in the identification of hazards and vulnerabilities in the proposed new start project and ensure that appropriate mitigation measures are developed.
- Advise designers and project staff in development of appropriate mitigation measures, specifications, and certification lists.
- Ensure the continued development and evolution of certification lists as the project moves through design and construction.
- Monitor progress of certification list completion throughout the project.
- Maintain a matrix of open items and resolve certification issues as they arise.
- Review conformance assessments and provide decisions on acceptance or correction of non-conforming items, including the nature of the required correction.
- Oversee certification and integrated testing in the lead up to revenue service.
- Coordinate pre-revenue readiness, emergency preparedness and safety/security outreach activities.

The SSC Chairperson (or designee) is responsible for arranging meetings, communicating decisions and queries to appropriate project staff for action, and preparing meeting agendas and minutes. The Chairperson (or designee) also maintains an open-items matrix and performs monitoring and auditing of the appropriate project and field office files.

3.5.1 Fire/Life Safety and Security Committee

A Fire/Life Safety and Security Committee specific to the CRC Project will be formed as a subcommittee to the CRC Project SSC. Committee members include representatives from TriMet and C-TRAN Capital Projects, Operations, and Safety and Security departments, local transportation agencies, jurisdictional emergency response organizations, such as police/sheriff, fire, and emergency medical services and other applicable stakeholders. The Fire/Life Safety and Security Committee helps to ensure compliance with fire and life safety codes and assists in emergency response preparedness prior to revenue service.

3.5.2 CRC Project –Start Up Committee

A project-specific CRC Project Start-Up Committee will be set-up as a subcommittee to the CRC Project Safety and Security Committee. The purpose of the Start-Up Committee will be to coordinate the numerous operational training; public safety outreach and public information activities that are necessary to successfully introduce the CRC Project to the community.

3.6 Integrated Safety and Security Tasks/Responsibilities Matrix

The following matrix combines the responsibilities for both safety and security tasks for the project into a single management document. This matrix also reflects TriMet and C-TRAN's ongoing commitment to the consolidation of the safety and security function's oversight and direction into a single department within each agency. The tasks matrix reflects in detail that safety and security functions are intrinsic to both project management and TriMet operations.

The "Integrated Safety and Security Tasks Matrix" shows the responsibilities of various individuals and committees as they relate to these specific tasks. Because of TriMet's commitment to integrating both safety and security into the CRC Project, these tasks and accompanying responsibilities have been combined into a single matrix. Given the nature of the project, in many cases C-TRAN staff, which are similarly positioned to TriMet staff, may be engaged jointly or in similar activities as they prepare their own operational plans, customer service and outreach and collaborate on project related preparations. The CRC Project SSC will monitor these activities.

Table 3-1. Integrated Safety and Security Tasks/Responsibilities Matrix

Safety and Security Tasks	TriMet Senior Management	Project Manager	Project Design Engineer(s)	Construction Engineer(s)	TriMet Contracts Management	TriMet Operations	TriMet Maintenance	TriMet Training	TriMet Legal	TriMet Customer Service	Safety and Security Committee	Fire/Life Safety and Security Committee	System Safety and Security
Engineering and Design													
Develop and Approve PMP	A	P	S	S	S	S	S	S	S	NA	NA	NA	R
Develop and Approve SSMP	A	R	S	S	S	S	S	S	S	S	R	NA	P
Develop and Approve SSPP	A	R	S	S	S	S	S	S	S	NA	NA	NA	P
Develop and Approve SEPP	A	R	S	S	S	S	S	S	S	NA	NA	NA	P
Develop and Approve Safety and Security Certification Program	A	R	S	S	S	S	S	S	S	NA	R	NA	P
Applicable Codes Standards and Regulations	S	A	P	S	S	S	S	S	S	NA	NA	NA	S
Develop Safety and Security Design Criteria	S	A	P	S	S	S	S	S	S	NA	NA	NA	R
Conduct Peer Review **PHA** **Threat and Vulnerability Analysis**	S	P	R	R	S	S	S	S	S	NA	NA	NA	R
Develop Safety and Security Certifiable Elements and Items	A	R	R	R	S	S	S	S	S	NA	NA	NA	P
Safety and Security Design Reviews and Approvals	S	A	P	S	S	S	S	S	S	NA	NA	NA	R
Issue Safety and Security Certification for Design	S	R	R	S	S	S	S	S	S	NA	A	NA	P
Construction													
Update PMP, SSMP and Safety and Security Certification Program	R	R	S	R	S	S	S	S	S	S	A	R	P
Construction Safety and Security Certification	R	R	S	R	S	S	S	S	S	S	A	S	P

Safety and Security Tasks	TriMet Senior Management	Project Manager	Project Design Engineer(s)	Construction Engineer(s)	TriMet Contracts Management	TriMet Operations	TriMet Maintenance	TriMet Training	TriMet Legal	TriMet Customer Service	Safety and Security Committee	Fire/Life Safety and Security Committee	System Safety and Security
Administer Follow-up Action Items List	R	R	S	R	S	S	S	S	S	S	A	S	P
Monitor Mitigation Options	R	R	S	R	S	S	S	S	S	S	A	S	P
Conduct Site Visits	R	R	S	R	S	S	S	S	S	S	A	S	P
Administer Fire Life Safety Issues List	R	R	S	R	S	S	S	S	S	S	R	A	P
Develop Outreach Training	R	R	S	S	S	S	S	S	S	P	A	R	R
Administer Safety and Security Certification Program	R	R	S	R	S	S	S	S	S	S	A	S	P
Administer Construction Safety Program	R	R	S	R	S	S	S	S	S	S	A	S	P
Develop Table Top Drills	R	R	S	S	S	S	S	S	S	S	A	P	R
Develop Operating SOPs	R	R	S	S	S	S	S	S	S	S	A	S	R
Coordinate Peer Review as Necessary	R	R	S	R	S	S	S	S	S	S	A	S	P
Pre-Revenue Testing													
Update PMP, SSMP and Safety and Security Certification Program	R	R	S	R	S	S	S	S	S	S	A	R	P
Administer Follow-up Action List	R	R	S	R	S	S	S	S	S	S	A	S	P
Conduct Site Visits/Input from Operating Personnel	R	R	S	R	S	S	S	S	S	S	A	S	P
Perform Field Drills and Tabletops	R	R	S	S	S	S	S	S	S	S	A	P	R
Perform Outreach Training	R	R	S	S	S	S	S	S	S	P	A	R	R
Administer Safety and Security Certification Program	R	R	S	R	S	S	S	S	S	S	A	S	P
Coordinate Regulatory and Other Readiness Reviews	R	R	S	R	S	S	S	S	S	S	A	S	P

Safety and Security Tasks	TriMet Senior Management	Project Manager	Project Design Engineer(s)	Construction Engineer(s)	TriMet Contracts Management	TriMet Operations	TriMet Maintenance	TriMet Training	TriMet Legal	TriMet Customer Service	Safety and Security Committee	Fire/Life Safety and Security Committee	System Safety and Security
Start-up/Opening													
Update PMP, SSMP and Safety and Security Certification Program	R	R	S	R	S	S	S	S	S	S	A	R	P
Administer Follow-up Action List	R	R	S	R	S	S	S	S	S	S	A	S	P
Monitor Outreach and Other Public Input	R	R	S	S	S	S	S	S	S	P	A	S	R
Complete Final Construction and Start-up Safety and Security Certification	R	R	S	R	S	S	S	S	S	S	A	S	P
Determine Work-A-Rounds/ Mitigations as Required	R	R	S	R	S	S	S	S	S	S	A	S	P
Administer Safety and Security Certification Program	R	R	S	R	S	S	S	S	S	S	A	S	P
Coordinate Regulatory Readiness Audits as Necessary	R	R	S	R	S	S	S	S	S	S	A	S	P
Revenue Service Monitoring													
Close Follow-up Action List	R	R	S	R	S	S	S	S	S	S	A	S	P
Routine Operations Phase Safety and Security Department Processes including incident reviews, Safety and Security Inspections, etc.	R	R	S	S	P	P	P	P	P	P	A	S	P

Figure 3-1. Responsibility Matrix Codes for Safety and Security Tasks Matrix

P Primary Task Responsibility. The identified participant(s) is (are) responsible for the preparation of the specified documentation or performance of the specified activity.	**R Review/Comment Responsibility**. The identified participant(s) is (are) to review and provide comment on the task or requirement.
S Secondary or Support Responsibility. The identified participant(s) is (are) to provide the necessary support to accomplish and document the task.	**A Approval Responsibility**. The identified participant is to review, comment and subsequently approve the task or requirement.

4. Safety Hazard and Security Threat and Vulnerability Management Process

4.1 Safety Hazard and Security Threat and Vulnerability Management Process

The CRC Project uses a formal process for the management of safety hazards and security threats and vulnerabilities. The purpose of the process is to:

- Identify and evaluate the effects of hazardous conditions and security threats and vulnerabilities on personnel, equipment, and the public.
- Define and evaluate countermeasures to eliminate or control the identified hazards and security threats and vulnerabilities.
- Provide timely notification of the identified hazards and threats and vulnerabilities to project personnel who must resolve them.
- Document the safety and security concepts incorporated and used during design, and provide the basis for developing procedures to either complement the design safety and security concepts or resolve the hazard and security threat/vulnerability through procedures or other means if the design did not adequately resolve the issue.

4.2 Hazard Analysis and Security Risk Assessment Responsibility

In the preliminary design stage of the CRC Project safety and security related reviews will be performed including a Peer Review and a Crime Prevention through Environmental Design (CPTED) Analysis. The reports and recommendations generated by these reviews will influence design throughout the development of the LRT component of the CRC Project design. All of the items listed in these reviews will be accounted for throughout the course of the CRC Project. While most of the items will be tracked on the Certifiable Items List (CIL), others – such as the Peer Review Recommendations –will be tracked on a stand-alone matrix.

The CRC Project Operations Committee will meet throughout the design of the CRC Project to provide input and comments on the design of the project to reflect operational needs of TriMet and C-TRAN. The committee’s input will enhance the safety and security of the customers, the public and TriMet and C-TRAN employees. Hazard analysis, field mockups and testing, as well as in-depth work sessions are used in this forum to assist in the decision making process.

A hazard and threat/vulnerability evaluation will be performed to help determine security enhancement needs at new station locations and park-and-ride facilities. The findings of this evaluation will be presented to the CRC Project SSC for implementation and resolution. These findings will be tracked through the committee to ensure they are all addressed.

4.3 Safety Analysis

A safety hazard is any real or potential condition that can cause injury, death or damage to or loss of equipment or property; a condition that may be a prerequisite to an accident; or a situation that has the potential to do harm. The objective of a safety analysis is to:

- Identify potential hazards resulting from failure of system elements, and determine the potential impact on the overall system, people, property, and the environment.
- Identify hazardous activities that could affect the transit system's safe operation.
- Identify potential accidents and the consequences (e.g., fatalities, injuries, damage, etc.) associated with each hazardous condition.
- Identify measures that will prevent accidents and minimize vulnerabilities by eliminating or controlling the underlying causal factors.
- Document the hazard analyses and security assessment results in a clear and concise manner, thereby facilitating resolution of the identified unresolved hazardous conditions and identifying the issues that have been resolved.

Hazard analysis includes a set of methodologies that first searches for the potential to do harm in the system. After finding such hazards, further analysis attempts to mitigate the hazard to an acceptable level. The objective of the hazard identification and analysis process is to identify and define as many hazardous conditions as possible and initiate the Hazard Resolution process before those conditions or associated activities cause an accident.

In preparation for the design and construction of the CRC Project an American Public Transportation Association (APTA) Peer Review will be conducted to assist in the evaluation of the proposed alignment. It is anticipated that recommendations will be made by the panel on how to mitigate concerns identified during the course of the review. These recommendations will be addressed and tracked throughout the course of the project and into startup of the CRC Project to ensure all concerns raised have been addressed and mitigated properly.

4.3.1 Hazard Identification

The hazards identified by the safety peer review group are derived from:

- TriMet and C-TRAN accident/incident data and experience.
- Accident/incident data from other light rail systems.
- Expert opinion of the representatives that work for transportation systems in other parts of the country that have similar operating environments as the Mall segment of the CRC Project.
- Hazard scenarios.
- Design data and drawings.

New safety hazards and security vulnerabilities will be identified through field assessments and surveys, design reviews, testing programs and start-up activities.

4.3.2 Risk Assessment Methodology

A risk assessment methodology has two steps: evaluating hazard severity and evaluating hazard probability.

4.3.2.1 Hazard Severity

The hazard severity rating is based on the definitions in MIL-STD-882-C. It is a qualitative determination of the worst case that could be anticipated to result from human error, design inadequacies, component failure or malfunction. The ratings are:

Category I, Catastrophic - Operating conditions are such that human error, design deficiencies, failure of an element, sub-system or component, or procedural deficiencies may cause death or major system loss. Catastrophic hazards require immediate termination of the unsafe activity or operation.

Category II, Critical - Operating conditions are such that human error, failure of a sub-system or component, or procedural deficiencies may cause severe injury, severe occupational illness or major system damage. Critical hazards require immediate corrective action.

Category III, Marginal - Operating conditions are such that they may result in minor injury, occupational illness or system damage. Marginal hazards indicate that human error, subsystem or component failures can be counteracted or controlled.

Category IV, Negligible - operating conditions are such that human error, subsystem or component failure or procedural deficiencies will result in less than minor injury, occupational illness or system damage.

The categorization of hazards is consistent with risk-based criteria for severity and reflects the principle that not all hazards pose an equal amount of risk.

Table 4-1 summarizes the Hazard Severity categories.

Table 4-1. Hazard Severity Categories

Category	Severity	Characteristics
I	Catastrophic	Death or system loss
II	Critical	Severe injury, severe occupational illness or major system damage
III	Marginal	Minor injury, minor occupational illness or minor system damage
IV	Negligible	Less than minor injury, occupational illness or system damage

4.3.2.2 Hazard Probability

The probability rating of a particular event or specific hazard may be defined by the number of times the event or hazard is likely to occur during the planned life expectancy of the CRC Project. The hazard probability is derived from TriMet safety data, historical safety data from similar light rail systems, and from expert opinion, such as the peer review group representatives. Table 4-2 is a summary of the Hazard Probability categories.

Table 4-2. Hazard Probability Categories

Description	Level	Specific Individual Event	Fleet or Inventory
Frequent	A	Likely to occur frequently	Continuously experienced
Probable	B	Will occur several times in the system's lifecycle	Will occur frequently
Occasional	C	Likely to occur sometime in the system's lifecycle	Will occur several times
Remote	D	Unlikely, but possible to occur in the system's lifecycle	Unlikely, but can be expected to occur
Improbable	E	So unlikely it can be assumed occurrence may not be experienced	Unlikely to occur but possible

4.3.2.3 Hazard Risk Assessment

The Risk Assessment Matrix, below, is then used to assess the level of risk for each identified hazard and to determine what action(s) must be taken to correct or lower the risk to an acceptable level.

Table 4-3. Risk Assessment Matrix

HAZARD CATEGORIES				
	I	II	III	IV
Frequency of Occurrence	***Catastrophic***	***Critical***	***Marginal***	***Negligible***
(A) FREQUENT	1A	2A	3A	4A
(B) PROBABLE	1B	2B	3B	4B
(C) OCCASIONAL	1C	2C	3C	4C
(D) REMOTE	1D	2D	3D	4D
(E) IMPROBABLE	1E	2E	3E	4E

HAZARD RISK INDEX	**CRITERIA BY INDEX**
1A, 1B, 2A, 2B, 3A	Unacceptable to TriMet
1C, 1D, 2C, 2D, 3B, 3C	Undesirable - Requires concurrence from the TriMet General Manager
1E, 2E, 3D, 3E, 4A, 4B	Acceptable with review - Requires Review by TriMet Security and Safety staff and **CRC Project** Safety and Security Committee
4C, 4D, 4^E	Acceptable

When the Hazard Severity Index is combined with the Hazard Probability Index, the result is the Risk Assessment Index. Each Risk Assessment Index requires a specific level of action. A hazard with a risk index of "Unacceptable" is not permitted. The design must be reevaluated to eliminate, or minimize and control the hazard to an acceptable level.

4.3.2.4 Hazard Resolution and Control

The Hazard Resolution and Control process involves the analysis and corrective action taken to reduce the risk associated with an identified hazard to the lowest practical level. The order of precedence for satisfying system safety requirements and resolving the identified hazards is as follows:

- Design for minimum risk. Design new facilities and equipment to eliminate hazards. If an identified hazard cannot be eliminated, its associated risks must be reduced to an acceptable level (see Risk Assessment Criteria) through the design selection.
- Utilization of safety devices. In the event that an identified hazard cannot be eliminated or its associated risk cannot be reduced through design selection, risk must be reduced to an acceptable level through the use of protective safety features or devices. Provision must be made and procedures must be issued for periodic inspection and functional checks of safety devices.
- Warning devices. When neither design nor safety devices can effectively eliminate identified hazards or reduce risk to an acceptable level, warning devices must be used to detect the condition and produce an adequate warning signal to alert individuals to the hazard. Warning devices should be standardized to minimize the probability of incorrect reaction of personnel to these warning signals.
- Develop Special Procedures and Training. When it is impossible or impractical to eliminate hazards through design selection or adequately reduce its associated risks through safety or warning devices, then approved procedures and special training programs must be used. Procedures may include the use of personal protective equipment. Precautionary notations and warning signs must be standardized. TriMet employees who perform critical tasks require certification of personal proficiency.
- **Note:** Warning, caution, and other forms of written advisories cannot be used as the only method of risk reduction for Category I (Catastrophic) and Category II (Critical) hazards.

4.4 Security Risk Assessments

Planning in advance of a terrorist act, crimes committed on transit property, or other security incident is essential in providing passengers and employees with a safe and secure environment. A security incident may result in serious injuries or death, destruction of property and facilities and the inability to continue transit operations to the region. To evaluate the susceptibility to potential threats and identify design corrective actions that can reduce or mitigate the risk of serious consequences from a security incident, TriMet will conduct a peer review Security Risk Assessment as previously stated above. The outcomes of the peer review will be provided to the design team so that they can be addressed during design to the extent possible. Additional assessments will be made as the project advances toward revenue service by Security and Safety staff from both TriMet and C-TRAN and coordinated through the CRC Project Safety and Security Committee.

4.4.1 Threat

A threat is defined as any action with the potential to:

- Cause loss of, or damage to, an asset.
- Death or injury to personnel and the public.

The CRC Project SST will assess security threats from theft, vandalism, graffiti, auto theft, robbery, trespassing, sabotage, terrorism and other criminal activities that may occur within the CRC Project system. The frequency and severity of the threats against people and property will be determined through input from TriMet Transit Police and City of Vancouver Police. People and property are defined as follows:

- People: Passengers, employees, and the general public
- Property: Stations, Light Rail Vehicles, Wayside facilities (communication rooms/cabinets and signal rooms/cabinets), fare vending machines, etc.

4.4.2 Vulnerability

Vulnerability is the susceptibility of the system that can be taken advantage of to carry out a to a particular type of security event. Vulnerabilities may be created by:

- Design and construction of the stations, guideway, wayside facilities, park-and-ride lots, and other physical assets.
- Equipment and technology used in the CRC Project
- Operating procedures.
- Policing and security practices.
- Proximity of transit system to potential targets that are not transit related.

CRC Project Safety and Security staff, TriMet Transit Police and City of Vancouver Police assist in the identification of vulnerabilities and in developing countermeasures to minimize the vulnerability to an acceptable level.

4.4.3 Frequency

The likelihood of occurrence (vulnerability) during the project cycle is categorized as follows:

A. Frequent – Indicates that a **definite** threat exists against the asset and that the adversary has both the capability and intent to attack or commit a criminal act, and that the asset is targeted on a frequently recurring basis.

B. Probable – Indicates that a **credible** threat exists against the asset based on knowledge of the adversary's capability and intent to attack or commit a criminal act against the asset, based on related incidents having taken place at similar assets or in similar situations.

C. Occasional – Indicates that there is a **possible** threat to the asset based on the adversary's desire to compromise similar assets.

D. Remote – Indicate that there is a **low** threat against the asset and that few known adversaries would pose a threat to the asset.

E. Improbable – Indicates **no credible** evidence of capability or intent and no history of actual or planned threats against the asset.

4.4.4 Consequence

In addition to threats, CRC Project Safety and Security staff evaluates the worst-case consequences of a security incident with input from the TriMet Transit Police unit, City of Vancouver Police, and TriMet and C-TRAN operations and maintenance staff. "Consequence" is defined as the amount of damage that may be expected from a successful attack or criminal act against an asset. Examples of consequences include; injuries to the public or to employees, loss of equipment or facilities, disruption to transit operations or the economy, evacuation of people living or working near the transit facilities and negative media coverage. Severity categories are defined to provide a qualitative measure of the result of a security incident.

I. Catastrophic – Loss of life and/or extensive damage requiring months to repair and very long-term interruption of service.

II. Critical – Serious injuries and/or significant damage requiring weeks to repair and long-term interruption of service.

III. Marginal – Minor injuries and/or minor damage requiring seven days or less to repair with short term interruption of service.

IV. Negligible – No injury and/or no or little property damage with little or no interruption.

4.4.5 Criticality Matrix

To illustrate consequences the frequency of threat and the likelihood of occurrence (vulnerability) are combined into a risk level (criticality) matrix (Table 4-4).The consequences are assessed in terms of severity of impact and probability of occurrence for a given threat. The criticality matrix organizes the resulting consequences into categories of high, serious, and low. The matrix aids TriMet, C-TRAN and the CRC Project Safety and Security Committee to prioritize vulnerabilities and to focus first on the most serious threats requiring resolution. Threats with vulnerabilities identified as "High" require further investigation of the potential occurrence and indicate that the condition cannot remain as-is, but must be mitigated. A "Serious" rating in the matrix indicates that countermeasures should be implemented, if at all possible, within fiscal constraints. A "Low" rating means that with review by TriMet and C-TRAN, the risk may be accepted without providing any countermeasures.

Table 4-4. Criticality Matrix

Frequency of Occurrence	Hazard Categories			
	I Catastrophic	II Critical	III Marginal	IV Negligible
(A) Frequent	H (IA)	H (IIA)	S (IIIA)	S (IVA)
(B) Probable	H (IB)	H (IIB)	S (IIIB)	L (IVB)
(C) Occasional	H (IC)	S (IIC)	L (IIIC)	L (IVC)
(D) Remote	S (ID)	L (IID)	L (IIID)	L (IVD)
(E) Improbable	S (IE)	L (IIE)	L (IIIE)	L (IVE)

Hazard Risk Index	Risk Decision Criteria	
IA, IB, IC, IIA, IIB	High (H)	Threat must be mitigated
ID, IE, IIC, IIIA, IIIB, IVA	Serious (S)	Threat should be mitigated if possible within fiscal constraints
IID, IIE, IIIC, IIID, IIIE, IVA IVB, IVC, IVD, IVE	Low (L)	Threat is acceptable with review by management

Source: Federal Transit Administration Public Transportation System Security and Emergency Preparedness Planning Guide

4.4.6 Threat and Vulnerability Resolution Process

Security threats and vulnerabilities are addressed to minimize crime exposure on the transit component of the CRC Project. Threat and vulnerability resolution includes:

- Redesign of the identified system element to eliminate or minimize the vulnerability.
- Security awareness program for operating and maintenance personnel.
- Procedures to minimize the impact of a security event.
- Physical enhancements.

5. Development of Safety and Security Design Criteria

5.1 Approach to Design Criteria

TriMet's Design Criteria provide guidelines and information that govern the CRC Project design. These criteria help to ensure that safety and security are "designed into" the CRC Project including the concepts of "Crime Prevention through Environmental Design" (CPTED) which helps to ensure the effective use of the physical environment to reduce the fear and incidence of crime.

The TriMet Director of Project Delivery/Engineering Support is responsible for the criteria. The criteria are updated to reflect lessons learned on all previous projects as well as industry advances.

Exceptions may be made within the framework of the Design Criteria or design standards to meet the requirements of a particular situation. TriMet's Design Contract Manager(s) must approve any deviation, after consultation with the Director of Project Delivery/Engineering Support and the CRC Project Director(s). If there is a potential safety or security impact, the Director of Operations Support is also consulted before it is included in the design. It is the responsibility of the design consultant to identify, explain and justify any deviation from the established criteria.

5.1.1 Codes and Standards

In addition to the TriMet Design Criteria, the American Railway Engineering and Maintenance-of-Way Association (AREMA) design standards are used to direct the CRC Project design.

Additional sources of design criteria for safety and security are derived from:

- The technical specifications from previous contracts.
- Applicable federal, state, and local codes and regulations, including Uniform Building Code, OR-OSHA, WISHA, etc.
- Standards defined by industry associations and boards, such as APTA, the American National Standards Institute (ANSI) and the National Fire Protection Association (NFPA).
- Project performance requirements.
- Requirements derived from safety/security peer reviews.
- Safety and security studies, such as Transportation Research Board reports.
- Manual on Uniform Traffic Control Devices, Federal Highway Administration, 2003.
- Transit Security Design Considerations, FTA, November 2004.

- Pertinent safety and security criteria and studies from other transit systems.

5.2 Approach to Specifications

Safety and security design criteria form the basis for the technical specifications and contract drawings. Basic safety and user requirements are included in procurement specifications for facilities, hardware, and systems, and are coordinated with all CRC Project staff, including Safety and Security staff. Many of the safety and security requirements in the specifications take the form of specific deliverables, such as manuals, reports, approved contract submittals, factory test procedures and results, and inspection reports.

The Safety and Security Certification Program assures that the CRC Project is constructed and tested in accordance with the safety and security requirements of the technical specifications.

5.3 Design Reviews

The Design Contracts Manager coordinates design reviews with all TriMet CRC Project staff. All reviews include TriMet staff representing Safety and Security, Facilities Management, Operations and Maintenance, and appropriate C-TRAN staff, to ensure that proposed designs complies with TriMet safety and security requirements and gives full consideration to concerns unique to C-TRAN's operating environment. Design reviews are held biweekly during the height of the design phase and less often thereafter.

During design reviews, consideration is given to such items as:

- System interactions.
- Human factors.
- Environmental parameters.
- Isolation of energy sources.
- Materials compatibility.
- Use and long-term storage of critical materials.
- Emergency responses, including emergency egress and rescue paths.
- Fire sources and protection.
- Equipment layout.
- Lighting requirements.
- Operational requirements.
- Maintenance requirements.
- Controlling access to platforms either through CPTED Principles or other design concepts to be considered by the project team.

Maximum use is made of existing data from TriMet and C-TRAN experiences.

6. Safety and Security Verification Process

6.1 Safety and Security Certification Program

One of the major activities of the CRC Project is the implementation of the CRC Project Safety & Security Certification Program (SSCP). The purpose of the SSCP is to ensure that prior to the start of revenue passenger service, design and operating hazards and security vulnerabilities are identified, evaluated and properly controlled or mitigated, to the extent possible, with available resources. The SSCP provides traceable verification that all safety-critical and security systems, subsystems, procedures and training programs have been reviewed for conformance with all applicable safety and security requirements, including codes, standards and industry practices. The program provides TriMet and C-TRAN's executive leadership with reasonable assurance that the CRC Project can operate safely and securely.

TriMet will self-certify that all safety and security critical systems of the CRC Project that may impact passenger, employee or public safety are operationally ready to enter safe and secure revenue service. The safety Certification process is closely monitored by the SSC.

6.2 Program Goals and Objectives

The goals of the SSCP are to verify that identified safety and security requirements have been met and to provide evidence that CRC Project equipment, systems and facilities are safe to use.

The objectives of the SSCP are to document that:

- Facilities and equipment have been constructed, manufactured, inspected, installed and tested in accordance with safety and security requirements in the design criteria and contract documents.
- Operations and maintenance procedures and rules have been developed and implemented to ensure safe operations.
- Training programs have been developed for the training of operating personnel, and emergency response personnel.
- Transportation and maintenance personnel have been trained and qualified.
- Normal, and emergency procedures and plans have been developed.
- Emergency response agency personnel have been prepared to respond to emergency situations in or along the transit component of the CRC Project system.
- Safety and security related system integration tests have been conducted.
- All security related issues have been addressed and resolved.

6.3 Safety and Security Certification Process

The certification process begins with system design and continues through the start of revenue operation. An outline of the certification process is shown below.

The Safety Certification Process includes the following components:

- The SSCP is developed for the transit component of the CRC Project
- Certifiable Elements and Certifiable Items Lists are developed for the CRC Project.
- The CRC Project Safety and Security Committee (SSC) monitor system hazard identification and resolution process.
- Design Conformance Checklists are developed and completed checklists are approved to verify that safety and security criteria are included in specifications and drawings.
- Specification Conformance Checklists are developed and completed checklists approved to verify that facilities, systems and equipment are constructed, installed, and tested in accordance with the design and specifications.
- Integrated Tests Conformance Checklists are developed and completed checklists approved to verify the functionality and compatibility of integrated systems and equipment.
- All open safety and security issues are resolved.
- Final Project Safety and Security Certificates are prepared under the guidance of the CRC Project Safety and Security Committee.

The Director of Operations Support, through the CRC Project SSC, monitors certification progress in preparing and completing the conformance checklists in a timely manner, reviews documentation assessments of the documentation that supports conformance with the safety and security requirements, and any open or unresolved items. The committee, based on the documentation, assessments and open-items, determines whether to accept the completed checklists and open-items list as-is or to require corrective actions to bring the checklists and/or open-items to an acceptable level. Upon evidence of satisfactory conformance with the certification requirements, the Director of Safety and Security issues a written safety/security Certificate of Conformance for the individual system element or sub-element, as applicable, along with any restrictions or work-arounds. In the event the documentation or action is security sensitive, disclosure is limited to those with a need-to-know.

6.4 Final Certification

After a Certificate of Conformance is issued for each major element and sub-element and the CRC Project SSC is satisfied, the Director of Operations Support recommends to the TriMet General Manager the issuance of a System Safety and Security Certificate. The Certificate signifies that the CRC Project is safe and secure for revenue service. Restrictions and work-arounds not affecting the safety or security of the CRC Project may remain on certain systems, allowing TriMet to operate the light rail system in a restricted mode. Such restrictions and work-arounds are documented and communicated in writing to all affected parties and remain in effect until fully resolved by the CRC Project SSC.

If the CRC Project Safety and Security Committee determines the safety and security requirements have not been met or insufficient evidence is available to demonstrate certification conformance, it has the responsibility and authority to recommend to the TriMet General Manager that revenue service be delayed until corrective action is taken.

6.5 Final Verification Report

A Final Verification Report will be prepared for the CRC Project, which will be approved by the CRC Project SSC. The report will summarize the safety and security certification status and the readiness of the CRC Project from a safety and security standpoint. The Final Report:

- Summarizes the safety and security certification process and describes status of:
  - Conformance checklist.
  - System testing activities.
  - Operations, maintenance and training activities.
  - Hazard and open items identification and resolution.
- Describes any operating restrictions.
  - Recommends action that should be taken to eliminate the restrictions.
  - Provides a recommended schedule for eliminating restrictions.

This page left blank intentionally.

7. Construction Safety and Security Program

7.1 TriMet Construction Safety and Security Program

Construction safety and security is a top priority in all TriMet construction projects, including the CRC where TriMet is one of the project partners along with C-TRAN and WSDOT, which is serving as the FTA grantee for construction of the light rail. TriMet has developed a construction safety and security program that is applicable to all TriMet construction projects, including the CRC Project. The specific requirements of the program are outlined in the TriMet document TriMet's Capital Projects and Facilities Construction Safety Program, dated May 2006. The purpose of the TriMet Capital Projects and Facilities Construction Safety Program document is to specify the construction contractor requirements in the development of site-specific safety and security plans that manage the safety and security risks associated with construction projects, including but not limited to contractor employee injury, property damage, public injury and pedestrian and vehicular traffic for the CRC Project. Compliance with the safety and security requirements is a stipulated provision in all TriMet construction contracts.

Although development of site-specific plans is the responsibility of the construction contractor, ultimate responsibility for construction safety and security rests with TriMet. The TriMet Safety and Security Office is tasked with reviewing and recommending approval/disapproval of the Contractor Safety and Security Plan, and for overseeing the contractor's construction safety and security program. The TriMet Project Director and Resident Engineers are responsible for enforcing the safety and security provisions of TriMet's Construction Safety and Security Program. The Project Delivery/Engineering Support Director has program responsibilities for construction safety, and the Senior Safety Specialists assigned to construction safety have a matrixed reporting responsibility to the Director of Operations Support and the Project Delivery/Engineering Support Director.

In addition to TriMet staff, it is intended that the project partners will work together to institute an Owner Controlled Insurance Program (OCIP) program, which would assist project staff in the administration of the construction safety and security program and would perform the following services:

- Perform on-site safety and security surveys.
- Assist with the investigation of accidents.
- Attend and participate in safety meetings with contractors.
- Monitor the TriMet Construction Safety and Security Program.
- Analyze loss trends.

7.2 Contractor Safety and Security Plans

Each construction contractor is required to develop and implement a project-specific Construction Safety and Security Plan that addresses the work to be performed for the transit component of the CRC Project and that conforms to the provisions of the TriMet Construction Safety and Security document and the Oregon (OR-OSHA) and Washington (WISHA) occupational safety and health requirements as applicable. The written plans are submitted to TriMet for review and approval.

The contractor's Safety and Security Plan must define the duties and responsibilities of contractor employees at all levels, including sub-contractor level, as they pertain to the safe execution of construction activities to be in compliance with the TriMet Safety and Security Program document. In addition, each construction contractor and subcontractor is required to designate a qualified safety representative to implement and administer the contractor's Safety and Security Plan.

7.2.1 Safety Requirements

At a minimum, the Contractor Safety and Security Plan must include the following components:

- Safety orientation.
- Job briefing.
- Job hazard analysis.
- Initial and periodic job safety training.
- Safety toolbox meetings/talks.
- Use of personal protective equipment.
- Safe work practices.
- Safety inspections.
- Fire prevention.
- Right-of-way (ROW)/Road Worker safety program (if working on or near railroad/light rail rights-of-way).
- Personal injury reporting.
- Accident/incident reporting and investigation, including reporting to TriMet.
- Safety Hazard Communication/Right-to-Know.
- Substance abuse.
- Emergency preparedness.
- Pedestrian and vehicular traffic control.
- Compliance with federal and state occupational safety and health and regulations.
- Protection of the general public and private property from construction activities.

The Plan must also address specific hazards associated with confined space entry, control of hazardous materials and response to hazardous materials spills, falls from elevations, exposures to toxic materials, electrical shock protection, hand and feet injuries, use of cranes and heavy equipment and other anticipated hazards.

Additionally, the Plan must require and authorize all construction supervisors to take appropriate corrective action when notified of an unsafe or hazardous situation, condition or practice.

7.2.2 Security Requirements

A component of the contractor's Construction Safety and Security Plan submission is a site-specific security plan. The security plan must address the unique threats and vulnerabilities during the construction phase of the transit component of the CRC Project, including theft of materials, vandalism, sabotage, trespass, and other security concerns identified in a security risk analysis conducted by TriMet Security and Transit Police. The security plan must, at a minimum, include:

- Perimeter and access control security measures.
- Job-site access procedures, including identification cards for construction personnel and visitors.
- Emergency procedures.
- Lighting plans.
- Security and police patrols of construction sites.
- Procedures for reporting and investigating security breaches.
- Layouts for construction trailers.

The contractor's security plan must also address the unique roles and responsibilities for site security and designate the individuals for implementing and administering the security plan.

7.3 Construction Vulnerability Analysis

The purpose of this analysis will be to identify and resolve or mitigate hazards, threats, and vulnerabilities that may be unique to the construction phase of the project, including but not limited to theft of materials, vandalism, sabotage, and trespass.

7.4 Drug and Alcohol Free Workplace

The use of drugs and alcohol is strictly prohibited on all TriMet and C-TRAN construction projects. As part of their Construction Safety and Security Plan, construction contractors and all subcontractors are required to submit a Substance Abuse Program that addresses the prohibited use of alcohol and drugs, including pre-placement, periodic, for cause, and post accident/incident testing.

7.5 Safety Incentives

It is common for monetary incentives to be offered to contractors who demonstrate exemplary safety performance. It is intended that the project partners will determine the amount of the monetary incentive and that it will be detailed in the OCIP manual. Similarly, the construction contractor will develop an employee safety award program to promote employee safety conduct. The contractor's incentive program will include both contractor and subcontractor personnel. The details of the contractor's employee safety incentive program will be outlined in the contractor's Construction Safety and Security Plan.

8. Oversight Requirements and Approvals

8.1 ODOT and WSDOT State Safety Oversight

The CRC Project will be subject to the ongoing Oregon Department of Transportation (ODOT) and Washington State Department of Transportation (WSDOT) State Safety Oversight (SSO) requirements.

8.2 Employee Training and Qualification

TriMet has an established training program for Light Rail Vehicle Operators, Bus Operators, Rail Equipment Maintainers, Maintenance of Way and Field Operations personnel. C-TRAN has an established training program for their Bus Operators and Field Operations personnel. Each program will be updated to include new information regarding the CRC Project. Elements of this training will also be part of the Operations Certifiable Items List. Training for the groups mentioned above begins prior to the start of revenue service and is periodically provided through recurrent training. Annual recertification of all Light Rail Operators, Supervisors and Controllers is part of the existing training program that will continue to happen with the CRC Project.

8.3 Training Records

TriMet Rail Operations Training, Bus Operations Training, Field Operations, Rail Equipment Maintenance, and Maintenance of Way Training will maintain files of all employee training and testing activities. Each training record will include an employee acknowledgement affirming the training received. Additionally, a database will be developed to track the training and testing activities and requirements of each operating employee. Similarly, C-TRAN will maintain verification that their effected Operators and Field Personnel have received training regarding the CRC Project.

8.4 Emergency Preparedness

TriMet and C-TRAN will update their own agency SEPP to reflect any unique operational preparedness requirements that apply to CRC Project operations.

8.5 Accident Investigations, Notifications and Reports

TriMet and C-TRAN will continue to use established procedures for the reporting, investigation, and maintenance of data for all accidents, casualties, injuries, illnesses, and grade crossing accidents, as required by 49 CFR Part 659 and requirements of the SSO.

8.6 Hours of Service Regulations

TriMet employees in safety sensitive positions will continue to be governed by current TriMet polices established for hours of service. Hours of service issues are monitored and reviewed by the SSO.

C-TRAN has an hours of service policy that they adhere to and self-monitor.

8.7 Drug and Alcohol Program

TriMet and C-TRAN will continue their current Drug and Alcohol Program that adheres to the following regulations: DOT 49 CFR Part 40, Procedures for Transportation Workplace for Drug and Alcohol Testing Program, and FTA 49 CFR Part 655 The Prevention of Alcohol Misuse and Prohibited Drug Use in Transit Operations.

8.8 System Safety Program Plan

The CRC Project will be included in the TriMet and C-TRAN System Safety Program Plans. The SSPP will be updated prior to revenue service to reflect any additional information determined during the implementation of the project.

8.9 System Security Plan

The current SEPP for TriMet and C-TRAN will be revised to incorporate the CRC Project and describe the security measures to protect passengers and TriMet and C-TRAN property as applicable.

8.10 APTA Audit

APTA will be requested to conduct an audit of the CRC Project SSPP.

8.11 Schedule of Activities

Table 8-1. Schedule of Activities

Activity	Delivery Date
Initial SSMP	Upon Approval
SSMP Updates	30 Days from Revision Date
Safety and Security Certification Program Plan	Upon Approval
SSMP Audit Notification	30 Days in Advance
Safety and Security Committee Meetings	Monthly
System Safety Program Plan	120 Days Prior to Revenue Service
Security and Emergency Preparedness Plan Revisions	120 Days from Revenue Service
Employee Training and Qualification Program	120 Days Prior to Revenue Service
Emergency Preparedness Plan	120 Days Prior to Revenue Service
Emergency Field Exercise	30 Days Prior to Revenue Service
Accident Notification and Reporting Procedures	30 Days Prior to Revenue Service
Drug and Alcohol Program	120 Days Prior to Revenue Service
APTA Audit	120 Days Prior to Revenue Service

Appendix M

Real Estate Acquisition Management Plan

This page left blank intentionally.

REAL ESTATE ACQUISITION MANAGEMENT PLAN (RAMP)

PE Application

September 4, 2008

Columbia River CROSSING

Title VI

The Columbia River Crossing project team ensures full compliance with Title VI of the Civil Rights Act of 1964 by prohibiting discrimination against any person on the basis of race, color, national origin or sex in the provision of benefits and services resulting from its federally assisted programs and activities.

Americans with Disabilities Act (ADA) Information

If you would like copies of this document in an alternative format, please call the Columbia River Crossing project office at (360) 737-2726 or (503) 256-2726. Persons who are deaf or hard of hearing may contact CRC using Telecommunications Relay Service by dialing 7-1-1.

¿Habla usted español? La informacion en esta publicación se puede traducir para usted. Para solicitar los servicios de traducción favor de llamar al (503) 731-3490.

TABLE OF CONTENTS

Appendices

ACRONYMS

ADR	Alternative Dispute Resolution
CFR	Code of Federal Regulations
CRC	Columbia River Crossing Project
C-TRAN	Clark County Public Transit Benefit Area Authority
DEIS	Draft Environmental Impact Statement
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
LPA	Locally Preferred Alternative
LRT	Light Rail Transit
LRV	Light Rail Vehicle
MAX	Metropolitan Area Express
NEPA	National Environmental Policy Act
ODOT	Oregon Department of Transportation
OMB	Office of Management and Budget
ORS	Oregon Revised Statutes
RAMP	Real Estate Acquisition Management Plan
RCW	Revised Code of Washington
ROW	Right of Way
SDEIS	Supplemental Draft Environmental Impact Statement
SFR	Single Family Residence
TriMet	Tri-County Metropolitan Transportation District
USC	United States Code
WSDOT	Washington State Department of Transportation

This page left blank intentionally.

Columbia River Crossing Project

Purpose

The Real Estate Acquisition Management Plan (RAMP) describes the property acquisition and management functions for the Columbia River Crossing (CRC) Project. The Columbia River Crossing Project is a bridge, transit, and highway construction project, linking the Portland-Vancouver metropolitan area across the Columbia River. This document provides particular emphasis on the light rail transit-related real estate activities to respond to requirements and review from the Federal Transit Administration (FTA). The CRC Real Property Team's approach will follow established best practices and all applicable federal, state, and local requirements. These regulations are further described in Section 1. The RAMP serves as a guide for implementing the real estate requirements of the CRC Project. The intent of the RAMP is to:

- Provide a description of the project and background.
- Define the roles of CRC Real Property Team staff and their coordination with other staff and consultants, including, but not limited to preliminary engineering, title reports, appraisal and appraisal review, acquisition, relocation, property management, environmental review, and demolition services.
- Outline acquisition priorities and strategies.
- Define property rights to be acquired.
- Define tasks necessary to advance through the acquisition process.
- Describe the reports and tracking systems to monitor the progress of the acquisition schedule.
- Provide a framework to advance through the acquisition process and remain in compliance with applicable laws, regulations, and procedures.

The overall goal of the RAMP is to assist the CRC Real Property Team, as well as other project personnel, in a common effort to secure real property needed for the project. The property to be acquired is necessary for the CRC Project, specifically construction and operation of a light rail system, including track way, stations, overhead power lines, substation sites, operator facilities, park–and-ride lots, utility relocations, and any other project needs.

The RAMP is presented in several sections, including the Project Description, Acquisition Program Approach, Acquisition and Relocation Process, and Scheduling, Reporting, and Record-Keeping.

Some acquisitions, especially those necessary for partial acquisitions, construction easements, and staging areas may not be identified until final design nears completion.

This page left blank intentionally.

1. Introduction

1.1 Background

The Columbia River Crossing (CRC) Project is a bridge, transit, and highway construction project, linking the Portland-Vancouver metropolitan area across the Columbia River. The area to be served is part of the South/North Transit Corridor, which proposed transit investments between Vancouver, Washington, downtown Portland, and Clackamas County. *The South/North Corridor Draft Environmental Impact Statement* (DEIS) was issued by the Federal Transit Administration (FTA) and Metro in February 1998. Several parts of the original South/North Corridor have moved forward since the 1998 South/North DEIS and the more recent South Corridor Project Supplemental Draft Environmental Impact Statement (SDEIS) (2002). The Interstate Metropolitan Area Express (MAX) Light Rail Project was advanced in 1999 with a Final Environmental Impact Statement (FEIS) and began operating in 2004. The I-205/Portland Mall Light Rail Transit (LRT) Project was advanced in 2004 with an FEIS and is now under construction, planned for opening in Fall, 2009. *The Interstate 5 Columbia River Crossing Project SDEIS* was published on May 2, 2008, and the Locally Preferred Alternative (LPA) was adopted into the two regional transportation plans governing the region on July 17 and July 22, 2008.

1.2 Legal Authority and Agreements

No enabling legislation is necessary for this project to move forward with real estate acquisition. Oregon Department of Transportation (ODOT), Washington State Department of Transportation (WSDOT), Tri-County Metropolitan Transportation District (TriMet), and Clark County Public Transit Benefit Area Authority (C-TRAN) already possess the necessary authority to allow right-of-way acquisition.

As the project progresses, intergovernmental agreements involving multiple stakeholders will be necessary. Solicitations will also be issued for design and construction contracts as the project proceeds.

1.3 Legal Requirements

The CRC Real Property Team will conduct all real estate acquisition, relocation activities, and transit joint development consistent with applicable federal regulations, contracting procedures and Office of Management and Budget (OMB) Circulars. The following specific federal regulations apply to the CRC project property acquisition program:

- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 Pub. L91-646, et.seq, as revised by the Surface Transportation and Uniform Relocation Assistance Act of 1987, Title IV of Pub. L 100-17.
- 49 Code of Federal Regulations (CFR) Part 24 (current version) titled Uniform Relocation Assistance and Real Property Acquisition Regulations for Federal and Federally Assisted Programs, Final Rule and Notice,et.seq.

- FTA Circular C 5010.1C dated Oct. 1, 1998, as revised, titled Grant Management Guidelines.
- FTA Policy on Joint Development, Federal Register, March 14, 1997 (Volume G2, Number 50)
- FTA Notice of Final Agency Guidance on the Eligibility of Joint Development Improvements Under Federal Transit Law, Federal Register, February 7, 2007, Volume 72, No. 25.

Applicable statutes regulating environmental aspects of acquisition, such as site inspection, survey of prior owners and uses, etc., include 42 United States Code (USC) Subsections 9601-9675, Oregon Revised Statutes (ORS) Chapters 459, 465, 466, and 468 and WAC 468-100-008.

The Real Property Team will receive updates through the International Right of Way Association, the Federal Highway Administration's Real Estate Exchange Website, and the Oregon and Washington State Department of Transportations. State Departments of Transportation act as the lead agency on federal projects that require application of the Uniform Relocation Assistance and Real Property Acquisition Act. TriMet's Real Property Section maintains a library of relevant documents. TriMet's Grants Administrator checks the FTA website daily and forwards relevant updated information to the appropriate staff.

For the transit component, WSDOT will follow the above FTA requirements as well. Final authority for all real estate actions involving purchase of property or property rights for transportation purposes for WSDOT property acquisitions rests with the United States Department of Transportation.

Final authority for all real estate actions involving purchase of property or property rights for the purpose of transit that take place within the TriMet service area rests with the TriMet Board of Directors. Contracting authority (which includes acquisition of real property) is delegated to the General Manager. Any transaction over $250,000 must be submitted to the Board of Directors for approval. The Board must also approve any condemnation action, regardless of the value of the property in question.

1.4 Project Description

The project (see map in Appendix A) is a multimodal project that will include a 2.9-mile extension of the Yellow Line across the North Columbia Harbor, across Hayden Island in Oregon, across the Columbia River, through downtown Vancouver, Washington, ending near Clark College.

A double track LRT alignment including a northbound and southbound guideway will be constructed to extend northward from the existing Expo Center MAX station. The alignment will curve toward I-5 as it passes beneath a newly constructed Marine Drive. North of Marine Drive the profile will rise as the guideway transitions onto a bridge structure to cross the North Portland Harbor. A station will be constructed on Hayden Island and the alignment will extend northward on Hayden Island along the western edge of I-5 until it transitions onto the new Columbia River Bridge.

The LRT guideway transitions from its own alignment onto a new combination highway and LRT bridge. The new Columbia River Crossing will consist of two parallel bridges. One bridge is designed for southbound highway traffic and both the northbound and southbound LRT. The other bridge will be designed to accommodate northbound highway traffic as well as bicycles and pedestrians, though the final location of bicycles and pedestrians may shift as design advances. The new southbound bridge will have two levels with highway traffic on the upper level and light rail trains on a lower level. The profile for the new bridges will be designed to provide enough vertical clearance above the river to permit barge and ship traffic to pass beneath without a lift or movable span.

After crossing the Columbia River on the joint highway/LRT bridge, the LRT alignment curves to the North out of the highway bridge and onto its own approach structure on the state of Washington side. The double guideway alignment will reach grade prior to the intersection with 5th Street, and continue north to 7th Street where the northbound guideway will curve away from Washington Street and run two blocks east to Broadway where it will turn north into the right-of-way for Broadway Street. The LRT alignment will then be aligned to form a couplet with the southbound guideway on Washington Street and the northbound guideway on Broadway Street.

The couplet will extend north from 7th Street running as a single-track guideway in the roadways of Broadway Street for northbound and Washington Street for the southbound LRT. The couplet arrangement will end after running 11 blocks north to McLoughlin Boulevard. There will be one station on Washington between 5th and 6th Streets, and two stations on the Washington-Broadway couplet: one pair of platforms between 11th and 12th Streets, and one pair of platforms between 15th and 16th Streets. In addition, there will be a 560-space structured park-and-ride lot near Mill Plain and 15th Street.

Once entering the right of way of McLoughlin Street, both northbound and southbound alignments curve to the east with double track guideway running east of Broadway Street in the median of McLoughlin Blvd. The double guideway alignment continues eastward approximately nine blocks crossing under I-5 and ending at a station in McLoughlin Boulevard and east of I-5. This station is on the western boundary of Clark College and will include a park-and-ride lot.

From the segments described above, the total length includes 0.7 miles of double track guideway in Oregon, 0.9 miles of bridge over the Columbia River, 0.8 miles of double track guideway and 0.6 miles of couplet (1.3 miles of single track guideway) in Vancouver. The total length of the alignment is approximately 2.9 miles.

1.4.1 Maintenance Facility

In addition to the project elements described above, the project will include an expansion to the existing Ruby Junction Operating and Maintenance Facility (in Gresham, Oregon) to accommodate the additional vehicles associated with the operations of the project. Improvements will include additional storage for Light Rail Vehicles (LRVs), and other maintenance material, an expansion of LRV maintenance bays, expanded parking for additional personnel, and a new operations command center, either at Ruby Junction or at a more central TriMet location.

1.5 Real Property Description

The current alignment will require the acquisition of up to 28 properties, the majority of which are located on Hayden Island in north Portland. These acquisitions include the potential displacement of four businesses and five residences. The affected residences consist of floating homes located on the southern bank of Hayden Island; where the LRT guideway would pass directly overhead. The affected businesses include a marine industrial facility on the southern bank of the Columbia Slough, three restaurants and one retail office supply store on Hayden Island. One of these restaurants may be acquired as part of the right-of-way acquisitions for the highway portion of the CRC project. At the northern terminus near Clark College, the project will acquire an entire property from Clark College which is currently being used for storage, some office space and for overflow parking. In Downtown Vancouver, six properties currently used as a gravel parking lot would be acquired for a park-and-ride.

There are partial acquisitions of 19 properties along the current alignment. The project will acquire frontage from baseball fields owned through the State of Washington by Clark College, and frontage from a community center. Through Downtown Vancouver and along McLoughlin Boulevard, there are several frontage takes from properties bordering the proposed alignment.

Permanent Easements and Temporary Construction Easements have not been identified at this time. A summary of acquisitions and acquisition types is shown in Appendix F.

The expansion of Ruby Junction Maintenance Facility will require the acquisition of 14 parcels in their entirety, and one partial acquisition. The initial property inventory indicates that six single-family residences and at least ten businesses will be displaced as a result of the proposed expansion. Refer to Appendix F for a summary of acquisitions and acquisition types at the Ruby Junction facility.

1.6 General Description of Process

The CRC is a bi-state multimodal capital investment proposal. Proposed development will necessitate real estate acquisition, which will be divided between the transit and highway real property teams, which together make up the overall project real property section. The highway real property team will include both ODOT and WSDOT with each agency acting as the lead agency for all acquisitions that include any portion of land or easement that is needed for the highway component of the development and is located within the lead agency's state boundary. The transit real property team will be led by TriMet, but include WSDOT and ODOT with C-TRAN oversight as part of the overall project. The transit team staff will focus on all acquisitions where an entire parcel of land or easement is needed for the transit component of the development.

Each lead agency differs somewhat in their processes and procedures as well as the laws that govern their decision-making and policy development. Refer to Appendix D for a table that outlines which agency will take the lead on which types of parcel acquisitions.

The Real Estate Manager is responsible for the implementation of the real estate acquisition and property management portion of this program in accordance with the RAMP. The Land Development Manager is responsible for the station area planning and development effort.

The acquisition, management, and relocation functions of the program, in accordance with the RAMP, achieve three objectives:

- Timely availability of property for project construction;
- Appropriate handling of property after acquisition; and
- Uniform and equitable treatment of those displaced from their homes or businesses as a result of the project.

TriMet is empowered to acquire property through authority conferred by the State of Oregon in Chapter 267 of the ORS. Eminent domain procedures are set forth in ORS Chapter 35. WSDOT is empowered to acquire property through authority conferred by the State of Washington in Revised Code of Washington (RCW) Chapter 8.04.

Real Property staff will coordinate and ensure adherence to the RAMP through ongoing meetings and reports during the project. The reports shall track acquisitions, relocations, hazardous materials remediation, demolition, all types of payments, and compare actual costs with projected costs.

The staff will perform closure, certification, and acquisition closeout; review all right-of-way costs incurred for the project to determine the level of FTA and Federal Highway Administration (FWHA) matching funds eligibility/recommendation; monitor the relocations and ensure that all claims, payments, and related assistance are performed in conformance with all applicable federal, state, and local regulations.

This page left blank intentionally.

2. Organizational Structure

2.1 Real Property Staff

The Real Property team is comprised of ODOT, WSDOT, and TriMet's assigned staff and selected consultants. Staff with direct responsibilities for the RAMP includes the Real Property Acquisition Manager, Real Property Specialists, and the Real Property Administrative Specialist, as well as support from Legal, Planning, and Engineering. See Appendix I for position descriptions of the Real Property Acquisition Manager and Real Property Specialists. Many of the specific tasks involved in acquisition and relocation may be carried out by contracted forces under the direction of the Real Property Acquisition Manager. Examples of contracted services would include environmental studies, appraisal, appraisal review, acquisition and relocation review, demolition, title search, and escrow services. In some cases specialized services or augmentation of existing staff functions may be required. The Real Property team expects to secure the services of a Real Estate attorney as the project progresses (see Organizational Chart, Appendix B) and will also rely upon guidance from the Oregon and Washington State Attorney Generals Offices as needed.

Real Property staff and selected consultants for the project have a thorough knowledge of the Uniform Relocation Assistance and Real Property Acquisitions Policies Act of 1970, as amended (the Uniform Act) and its implementing regulations, FTA guidelines and procedures for acquisitions, and also Oregon and Washington state statutes and regulations, civil rights laws, and other applicable federal and state regulations.

The staff is responsible for organizing and managing the acquisition program; soliciting, evaluating, hiring, and managing the consultants; monitoring and directing progress on the acquisition program, including schedule and budget; and coordinating the acquisition effort not assigned or appropriate for the consultant's scope of work. The staff will direct and manage the activities of consultants; monitor their progress; review invoices for payments; and coordinate activities among the various disciplines.

2.2 Contract Support

Together the Real Property Team manages 14 appraisal firms, ten appraisal firms contracting for specialty appraisals and four firms performing appraisal reviews any of which can be drawn upon for particular needs. In addition, WSDOT has access to two acquisition and relocation firms that are included on their state on-call contractor list. In addition, proposals will be developed to hire consultants for Legal Descriptions and Demolition services as needed.

2.3 Coordination with Outside Agencies

Coordination with outside agencies includes, but is not limited to, acquisition program oversight, title and escrow, appraisal, appraisal review, environmental assessment, relocation services, acquisition, outside legal counsel, and funding approval by the FTA.

Quarterly review meetings with regional FTA staff will provide the opportunity for acquisition program review. The transit Real Property Acquisition Managers will meet with the Project Management Oversight consultants on a bi-monthly or other regular basis.

2.4 Project Coordination

Successful implementation of this RAMP is dependent upon the coordination of the acquisition program with other simultaneous activities of the project as a whole. The Transit Project Engineering Manager will serve as the overall manager and coordinator for project activities.

The Real Property staff will continue to work with the project team through the design and construction phases, primarily through the Right of Way Engineer, Design Managers and Resident Engineers. Real Property staff will regularly coordinate activities and decisions with the design and project teams to assist in the determination of right of way needs. Project teams meet on a regular basis to discuss the project progress. Real Property staff attends project coordination meetings. In addition, Real Property staff participates in a separate coordination meeting with project staff to discuss right of way issues and acquisition status.

Real Property staff will work with Community Relations Staff, consultants, and the project team to address the issues, needs, and concerns of the individuals or businesses directly or indirectly impacted by the project. The Community Relations staff will schedule or coordinate meetings with individuals or businesses requesting information on acquisition and/or the relocation process.

Project coordination by the Real Property staff includes:

- Development and update of design criteria to assist consultant and project team.
- Coordination of the sequence of acquisition tasks to conform to state and federal regulations and the design and construction schedules.
- Annual review of the acquisition process by independent outside auditors.
- Regular review of project real estate requirements, including any required revisions to the acquisitions program as the final design proceeds.
- Linking project milestones, master schedule information, and project constraints to the acquisition tasks and other project control tools through the right-of-way (ROW) database.
- Reviewing various design submittals and any other submittals that may affect the acquisition program.
- Activity coordination with the Project Director through progress meetings, status reports, and other support meetings.
- Working with the Project's Community Relations staff to develop information and procedures for the acquisition program and advise about contact with property owners or other interested parties.

- Informing other project staff of changes in the acquisition program due to impacts from the discovery of environmental issues, tenant relocation, eminent domain, excess lands, mitigation requirements, demolition, or joint development opportunities.
- Working with the assigned Program Management Specialist to provide regular updates on schedule, budget requirements and cash flow, status of acquisitions, and contract status from the ROW database to the Project Director.
- Working with the Environmental Permits/National Environmental Policy Act (NEPA) Coordinator to ensure environmental compliance on all acquisitions.

2.5 Design Control

The Real Property staff will review the preliminary plans with the project staff. The purpose of the review is to develop an understanding of the need for each parcel and to identify possible problems based on the nature of the individual acquisitions, property ownership, or land use.

As the project develops, the ROW Engineer will work with the Design Managers to verify the need for each parcel. The WSDOT, ODOT, and TriMet engineering staff will review documents for technical accuracy. Only parcels that have been certified will be pursued for acquisition. Once a parcel has been certified, design changes that affect the legal description of the parcel shall be referred to the Change Control Board (CCB) for approval. The Environmental Permits/ NEPA Coordinator is a member of the CCB and shall verify NEPA compliance for the modified acquisition.

2.6 Offer of Just Compensation

Just compensation is the amount determined as the fair market value of a property plus any damages or other compensation required by law. The review appraiser recommends the amount of just compensation. The offer of just compensation is established by the Real Property Manager or his/her designee. For WSDOT employees acting as Review Appraisers, the Review Appraiser establishes just compensation. FTA concurrence is required when the recommended offer of just compensation exceeds $250,000 and when any administrative settlement is more than $50,000 over the lead agency’s offer.

For property being acquired by TriMet, final authority for all real estate actions involving purchase of property or property rights rests with the TriMet Board of Directors. Contracting authority (which includes acquisition of real property) is delegated to the General Manager. Any transaction over $250,000 must be submitted to the Board of Directors for approval. The Board must also approve any condemnation action, regardless of the property value in question.

All lead agencies will follow procedures mandated by their governing bodies.

The appropriate person at each lead agency shall set just compensation. When the acquisition is considered to be minimal, market value may be set using an Administrative Determination of Just Compensation.

Lead agencies will use staff or contracted staff to prepare documents for purchase of property.

2.7 Authorization of Condemnation

Every effort will be made to acquire real property by negotiated purchase, donation, or by dedication. No property owner will be required to surrender possession of real property without receiving the fair market value and just compensation to which they may be entitled. In the event that an agreement cannot be reached through negotiation, the lead agency may initiate eminent domain proceedings in accordance with Oregon or Washington law. Legal action will be initiated only if it is evident that an agreement is not forthcoming, and only after concurrence between the acquisition consultants and Real Property staff.

Prior FTA concurrence for transit acquisitions may be required. The current threshold for TriMet is $250,000. For acquisitions at or below the $250,000 threshold, the lead agency may execute an administrative settlement for up to $50,000 over the established just compensation; however, if the administrative settlement is more than $50,000 over the established just compensation, FTA must approve the amount.

Lead agencies must acquire condemnation authority through normal processes.

3. Acquisition Schedule

3.1 Acquisition and Relocation Timeline

TriMet, ODOT, and WSDOT will acquire all property rights necessary for the implementation of the project, within schedule and budget constraints. The acquisition process will be in strict conformance with the laws, regulations, and guidelines for real property acquisition and individuals' property rights (see Section 1). The Project will give the utmost consideration to the needs of those directly impacted, the property owners and tenants.

A project schedule has been developed which includes the following components: right-of-way acquisition activities, property management, demolition, and construction (see Appendix C). Durations for each activity on the schedule will be developed as the project progresses.

Other local jurisdictions have control of streets or properties affected by the project. Agreements with ODOT, WSDOT, the City of Portland, and the City of Vancouver will help define TriMet and WSDOT's use and obligations of property under the ownership of other agencies.

Once TriMet or WSDOT receives approval to begin the acquisition process, descriptions will be ordered. Phase I and II Environmental Reports, and Preliminary Title Reports will follow. Appraisals will be ordered, and the property owners will be contacted. When the appraisals are reviewed and compensation approved, property owners will again be contacted, presented a proposal, and the acquisition process will proceed. Displaced occupants will be given a 90-day assurance notice and provided additional information about the potential for relocation benefits and assistance.

The Real Property staff, in anticipation of project needs, is initiating the procurement process to assure that consultants are available to assist in the appraisal, acquisition, relocation, environmental, and demolition activities. No acquisition will proceed prior to the Record of Decision, unless prior communication and required approvals have been obtained from FTA.

The schedule for acquisition is general in nature and not parcel specific. The schedule includes sufficient time, if necessary, to use eminent domain procedures or other legal procedures needed to obtain possession of a particular property. Refinements to the schedule will be made as the project schedule becomes more detailed.

Large industrial businesses frequently require extensive relocation planning and sufficient time to locate a replacement site. It is anticipated that several of the potential business relocations may take 18 – 24 months in order to relocate to a replacement site. Smaller businesses and residential properties typically do not require as much time, but must be allowed adequate time to meet their needs.

3.2 Commencement of the Acquisition Process

The initiation of the acquisition process will not begin until after the Record of Decision (ROD). The current anticipated date for the ROD is late 2009.

3.3 Relationship of Design to Acquisition

General requirements for right of way for all project facilities are determined during preliminary engineering. Boundaries of the proposed right of way are established and mapped based upon the engineering design including track placement, station platforms, park-and-ride lots, maintenance facilities, access roads, etc. In addition, temporary or construction easements are identified and mapped. A review of alternative sites or locations is conducted, where appropriate, to identify parcels that could minimize the impact or cost of the project. The specific dimensions of parcels to be acquired are determined in final design.

In the preliminary engineering phase properties needed for operating right of way, permanent easements, and station sites will be identified. Final design engineering will further identify temporary construction easements and other acquisition needs, including, but not limited to, the location of access easements (if any), sub-station sites or other auxiliary buildings, staging areas, and temporary construction easements throughout the project.

During final design, engineering staff will survey the required right of way and certify the parcels through preparation of individual parcel descriptions that identify type of acquisition (entire, partial, easement), specific dimensions of the proposed acquisition, purpose, and other relevant information.

The Real Property staff will use the preliminary plans to develop an inventory of the affected properties and property owners. This information is collected in a database program, including the owner’s name and address, property address, and tenant’s name, if available. Additional data will be added as the acquisition process advances. A variety of reports can be generated from this database.

A legal description and right of way map will be prepared for every parcel certified as necessary to be acquired.

Changes to the right of way needs are anticipated as the project proceeds through final design. The need for revisions could arise for many reasons, including, but not limited to, engineering requirements, hazardous materials contamination, and new information as construction needs become apparent, or from a desire to avoid schedule delays caused by litigation or relocation problems.

The project staff must present revisions to the CCB for approval. Any revisions will be reflected on the right of way map, descriptions of needed property rights will be adjusted and the parcel will be re-certified as needed.

3.4 Difficulties and Potential Delays

The development of legal descriptions will be critical to the acquisition of property needed for the project. In order to avoid potential delays, TriMet, and WSDOT will request an early start on the preparation of descriptions.

3.5 Reporting Progress

A database will be developed to track the status of each parcel as it moves through the acquisition process. This is still in development, but will be functional prior to the onset of property acquisition.

3.6 Critical Path

The onset of the acquisition process is the critical path in acquiring needed parcels. The Record of Decision is anticipated in 2009.

This page left blank intentionally.

4. Cost Estimate

4.1 Estimate Background and Basis

The current right-of-way cost estimate for the Columbia River Crossing Project is being developed, excluding staging sites, access easements, and temporary construction easements throughout. As right-of-way needs are further defined, the estimated costs will be modified. The Real Property staff will continue to monitor the property needs and update the cost estimate, as the project is refined and also after approval for right of way purchases, and as the appraisals begin and appraised values are available.

Cost estimates will be compared with actual expenditures throughout the acquisition process through coordination with the assigned Program Management Specialist. Generally, once the acquisition process is initiated, costs will be updated on a monthly basis.

This page left blank intentionally.

5. Acquisition Process

Property acquisition and management includes all activities related to identification and purchase of properties, relocations, demolition, interim property management, and the disposition of excess property. The relocation function includes all services provided for residential and business displacements. The Real Property Acquisition Managers, with the support of other Project departments, are responsible for implementing the real estate acquisition and property management portion of this Plan.

The acquisition, management, and relocation functions of the Plan achieve three objectives:

1. The timely availability of property for project construction,
2. The appropriate handling of property after acquisition, and
3. The uniform and equitable treatment of those impacted by property acquisitions.

The project's acquisition process is subject to state and federal law and regulations. TriMet and WSDOT have established acquisition policies and procedures, in accordance with state and federal regulations and guidelines.

In the preliminary engineering phase properties needed for operating right of way, permanent easements, and station sites will be identified. Final design engineering will further identify temporary construction easements and other acquisition needs, including, but not limited to, the location of access easements (if any), sub-station sites or other auxiliary buildings, staging areas, and temporary construction easements throughout the Project.

The Real Property staff will use the preliminary plans to develop an inventory of the affected properties and property owners. This information is collected in a database program, including the owner's name and address, property address, and tenant's name, if available. Additional data will be added as the acquisition process advances. A variety of reports can be generated from this database.

The acquisition program schedule is influenced by several priorities: construction schedule, relocation activities, potential for hazardous materials remediation, demolition, and potential for eminent domain procedures.

Priority will be given to the full fee acquisitions where relocation is required or where condemnation may be required. Business relocations typically require more time than residences in both appraisal and relocation.

To evaluate individual acquisitions, the following questions and issues will be reviewed:

- Does the lead agency need full title to the property or only the need to control the right of way?

- Is relocation of the occupants or personal property required?
- Is the property owner occupied or tenant occupied?
- Can feasible adjustments in the project design eliminate or reduce potentially difficult acquisitions or avoid potential litigation?
- Does the project or the acquisition program avoid possible condemnation blight or inverse condemnation potential?
- Is there a need for early acquisition or relocation? Are any of the owners or tenants facing hardships such as foreclosure, health problems, job relocations, or other losses that may cause a delay in selling or difficulty in relocating?
- Discussions are underway with ODOT, WSDOT, and other local jurisdictions to use property under the control and ownership of other agencies.
- Will any of the parcels need a longer review and approval by funding authorities because the appraised value exceeds the dollar value threshold?
- Is additional right of way needed for relocating public and private utilities?
- Will the demolition and removal of structures occur during right of way acquisition or during construction?

Parcels on the market or parcels that become available for acquisition should be purchased immediately as soon as the environmental process has cleared the acquisition. This avoids potential claims of condemnation blight or potential damages if the prospect of the project were to worry potential purchasers or tenants.

5.1 Acquisition Strategies

The major component in establishing acquisition priorities is the project schedule. In order to meet the construction schedule, it is prudent to assess the needs and concerns of individual properties and property owners in setting priorities.

Of the parcels affected, many businesses are entire acquisitions involving relocations. Since the appraisal and relocation process can be lengthy, these businesses will be considered on the critical path to meeting the project schedule and will be the earliest on the acquisition schedule. Those properties with residential displacements represent the second focus.

Every attempt will be made to acquire the needed right of way through negotiated settlements, donation, or by dedication. Although every effort will be made to reach this goal, it must be tempered with consideration for budget, schedule, and litigation risk. No property owner will be required to surrender possession of real property without receiving fair market value and just compensation to which they may be entitled. In the event that an agreement cannot be reached through negotiation, the lead agency may initiate eminent domain proceedings in accordance with Oregon or Washington law, based on the location of the parcel. The planning and scheduling for the project allows for eminent domain, if necessary.

All property acquisitions required for construction activity will be completed prior to the Notice to Proceed (NTP) to the construction contractor. The lead agency intends to have control of the needed property before issuing a Notice to Proceed. However, if the lead agency has not acquired all required properties, the contractor will be informed. Current practice on timing of acquisition related to NTP varies somewhat between WSDOT, ODOT, and TriMet. Within the CRC Project, these three partners will develop a procedure to integrate these practices into a single, coherent strategy for CRC prior to the need for issuing NTP.

The initial steps for a successful negotiation or eminent domain are the same. Once negotiations have reached an impasse, or in order to achieve expected schedule objectives, the Real Property staff will recommend that the lead agency initiate eminent domain proceedings to acquire the necessary property rights. For planning and budgetary purposes, it is anticipated that approximately 10 percent of the acquisitions will require the use of eminent domain. Prior light rail projects in the region have required fewer, if any, condemnations, so this is a conservative budgeting and planning approach.

5.2 Property Interests to be Acquired

Properties required for the project would typically be acquired in fee simple, unless a lesser interest is in the lead agency’s best interest. If a lesser interest is sought, there must be adequate control to assure the safe construction, operation, and maintenance of project facilities on an ongoing basis. A brief description of each type of property interest is discussed below.

WSDOT, as the grantee, will purchase any property required for the LRT project on the Washington side of the river and will maintain control of the property during construction. However, at the completion of the project, the property will be transferred to C-TRAN as the permanent owner.

5.2.1 Fee Simple

In general, all land acquired for transit right of way, stations, park-and-rides, maintenance yards and related facilities will be purchased in fee simple by a deed or other appropriate document accurately describing the area being acquired. Properties acquired in fee simple may be partial or full acquisitions of parcels. Some partial acquisitions may become public street right of way and will be dedicated to the appropriate jurisdiction.

5.2.2 Permanent Easements

It may be necessary to purchase permanent easements for certain slopes, drainage ditches, utilities, irrigation ditches, or other facilities wherein the lead agency does not require the full rights, as with property acquired in fee simple. If the placement of the facility on the land within a permanent easement continues to provide the property owner a degree of utility in the land without jeopardizing the facility, then a permanent easement is warranted.

5.2.3 Temporary Construction Easements

A temporary easement may be required in cases where land is needed temporarily, usually for construction purposes. This type of easement will carry a time limit and specify the use for which the area is needed. Upon termination of the temporary easement right, the lead agency’s right to use the area ceases with complete use restored to the fee owner. The instrument will specify the condition to which the property is to be restored at the termination of the easement. As a matter of practice, temporary easements are recorded only if the term exceeds one year. The temporary easement conditions become contractual obligations when a document is accepted, whether or not it is recorded.

5.2.4 Permits of Entry

A permit of entry allows the lead agency to enter upon a property owner's land for a specific purpose and period of time to facilitate preliminary engineering functions, such as geological testing, inspection, or construction in advance of completing acquisition negotiations. The lead agency contacts property owners and a permit of entry agreement is executed stating the purpose, duration and conditions for access to a particular property.

5.2.5 Special Permits

Certain special permits may also be required, such as noise or parking mitigation permits. These permits are usually specific to the needs and habits of each property owner. Since the project is near some residential, commercial and industrial properties and because parking and/or loading patterns will be disrupted during construction, special permits may be required and will be addressed during property acquisition discussions.

5.3 Plans

General requirements for right of way for all project facilities are determined during preliminary engineering. Boundaries of the proposed right of way are established and mapped based upon the engineering design including track placement, station platforms, park-and-ride lots, maintenance facilities, access roads, etc. In addition, temporary or construction easements are identified and mapped. A review of alternative sites or locations is conducted, where appropriate, to identify parcels that could minimize the impact or cost of the project. The specific dimensions of parcels to be acquired are determined in final design as described above.

Property owners’ requests for minor modifications will be considered. The acquisition agent will bring the owner’s concerns to the Real Property staff, which will then present the concerns to the design staff. If reasonably feasible, the request will be honored.

Changes to the right of way needs are anticipated as the project proceeds through final design, and will be administered as described above.

5.4 Certification Process

Prior to the onset of property acquisition, each agency will verify the need for each parcel.

All property acquisitions required for construction activity will be completed prior to the Notice to Proceed to the construction contractor. The lead agency intends to have control of all the needed property before issuing a Notice to Proceed. However, if the lead agency has not acquired all required properties, the contractor will be informed and the lead agency will work with the contractor to mitigate potential delays.

5.5 Ownership & Title Information

Preliminary information on the ownership of properties proposed for acquisition is determined using assessor's rolls and through online services such as Portland Maps, Google Earth, and Metro Scan, as well as title reports. Title information is provided through a local title company.

During preliminary engineering, initial contacts are made with property owners to notify them of the intended acquisition and to obtain information on the configuration or use of the property that may be relevant to the engineering effort.

As property needs are determined, a preliminary title report may be ordered for each parcel. If changes occur in the ownership of the property, a supplemental title report is requested.

5.6 Environmental Review

During preliminary engineering, a determination may be made that environmental contamination, wetland delineation, and/or geotechnical investigations are necessary to confirm certain conditions prior to proceeding with further engineering design. Specialized consultants, at the direction of lead agency staff, will carry out such work. Where possible, the Real Property staff will manage environmental contamination investigations associated with property acquisition. This work will be conducted sufficiently early in the design process to provide information to be used in the appraisal process.

In addition, the Real Property unit will work with the Environmental Permits/NEPA Coordinator to verify NEPA compliance on all property acquisitions.

5.7 Appraisals

Federal regulations require that most properties be appraised to determine the fair market value and establish the amount of just compensation to be offered to the property owner. When the estimated property value is under $10,000 and the valuation problem is uncomplicated, an administrative determination or lesser appraisal may be performed. An appraisal assignment may require the appraisal of fee simple title or some partial property interest such as an easement, or a combination of these. One appraisal and a reviewer’s analysis are required for an acquisition. In the case of more complex properties, more than one appraisal may be prepared. If the estimated market value is high or the appraisal involves complex or controversial issues, it is sometimes considered prudent to have at least two appraisals. The reviewer’s analysis would then recommend just compensation based on one of the two appraisals. Appraisals and reviews will be conducted by contracted forces, using licensed appraisers, or by qualified staff appraisers.

The property owner is notified in writing of the lead agency’s interest in acquiring the property. The initial letter informs the owner of the rights and protections they are entitled to by law and advises them of the proposed schedule and process for conducting the appraisal. The owner or the owner’s designated representative is provided the opportunity to accompany the appraiser during the appraiser’s inspection of the property. Prior to the appraisal, an attempt will be made to inspect for any conditions (environmental, etc.) affecting the fair market value. The appraisal will take into account the impact of hazardous substances or wastes affecting the property and the cost of control, cleanup or treatment necessary to render the property usable for project purposes. The appraisal is submitted to a review appraiser who prepares a review appraisal form either concurring with the appraiser's estimate of value, or recommending adjustments.

The length of time required to prepare an appraisal is dependent upon the complexity of the appraisal assignment and the workload of the individual appraiser. A complex appraisal may take three months or more to complete, plus the additional time to solicit and award the bid. Less complicated appraisals may take only a month, plus the time to solicit and award the bid. Three original copies are returned for review. One copy is provided to the property owner. A second copy is provided to the acquisition agent and the final original stays with the Real Property file.

5.8 Appraisal Review

The Appraisal Review function is conducted by a licensed appraiser. It is the responsibility of the review appraiser to assure that the appraisals meet applicable appraisal standards, and conformance with the Uniform Act. Typical turnaround time is usually two to three weeks, in addition to the time required to award the bid. If the recommendation for Just Compensation exceeds $250,000, the lead agency will seek concurrence from FTA and/or FHWA as well as approval from their final authority on acquisitions (e.g., Board of Directors).

5.9 Just Compensation

Just compensation is the amount determined as the fair market value of a property plus any damages or other compensation required by law. The review appraiser recommends the amount of just compensation. The Offer of just compensation is established by the Real Property Manager or his/her designee. FTA concurrence is required when the recommended offer of just compensation exceeds $250,000 and when any administrative settlement is more than $50,000 over the lead agency’s offer.

Final authority for all real estate actions involving purchase of property or property rights rests with TriMet’s Board of Directors or in the case of WSDOT the Director of Real Estate Services.

5.10 Negotiations

The Real Property Acquisition Manager or a designated right of way agent is assigned to negotiate a purchase agreement with the property owner. If contracted agents are utilized, a letter outlining the acquisition and relocation is sent to the contractor, along with copies of the appraisal, review, title report, and any other pertinent information.

The agent makes a written offer to the property owner, including a statement of the basis for the offer of just compensation. At this point, the process will vary somewhat based on the location of the property and therefore the lead on the acquisition. All acquisitions require an offer and a copy of any lead agency appraisal, used as a basis for the offer. In the state of Oregon the offer carries a 40-day acceptance period during which time the owner may accept the offer and execute the purchase and sale agreement. For WSDOT-led acquisitions, each purchase and sale agreement is considered a non-standard agreement and must be individually reviewed and approved by the state Attorney General’s Office. All reasonable efforts will be made to meet with the owners or their representatives to discuss the offer and resolve any differences in the amount of the offer or terms of the purchase. The lead agency or its agents will not take coercive action in seeking an agreement on price or any other condition of the acquisition. Any owner who resides outside of the local area will be contacted by telephone to discuss the offer and will receive the written offer by certified mail.

The contractor will work with lead agency staff to determine what documents are necessary to complete the transaction and any additional approvals that are necessary. When the purchase and sale agreement is executed, all required documents and funds may be deposited with an escrow company. Upon payment of funds, escrow is closed and the change of title is recorded with the County Recorder's Office.

The Acquisition agent is expected to provide signed documents to the lead agency for final processing. If legal action is required, that agent will provide a Recommendation for Condemnation to the lead agency, outlining the property owner's demands or other reasons that the file cannot be resolved without legal action.

The contractor also submits a Diary of Personal Contact on each parcel with either the settlement documents or the request for legal action. This report outlines all contacts and discussions with the property owner and tenants. The agent may be requested to be available if the file cannot be settled and the lead agency determines that either Alternative Dispute Resolution (ADR) or Eminent Domain proceedings are required.

Administrative Settlements

If an owner declines the offer of just compensation, the agent conducting the negotiations may recommend an administrative settlement. Lead agency staff will determine whether an administrative settlement is appropriate based on review of the facts concerning the acquisition. If they agree that an administrative settlement is warranted, they will obtain the required lead agency approvals and FTA and/or FHWA concurrence, if the settlement is $50,000 or more above the appraised value. The acquisition agent may then be requested to obtain the necessary signatures and provide a letter of justification documenting the need for the higher amount.

5.11 Closing and Taking Possession of Property

The lead agency will take possession of the property in accordance with the approved purchase agreements and initiate demolition, if required, in compliance with the Project construction schedule. If the property is not required immediately, the lead agency may elect to lease it or otherwise secure it until such time as construction commences (See following subsection on Property Management). If the property is required immediately, the lead agency may apply to the court for an order of immediate possession.

A title company is utilized in the closing process when a fee acquisition is indicated and when the lead agency deems their assistance necessary. The title company makes adjustments for tax prorates, if necessary, and provides a title policy. It may also be necessary to obtain a release of an existing mortgage when required by the lender. Typically, a Warranty Deed is utilized to convey fee interest in a property. Documents are sent to the title company for final closing and payment.

Property taxes are prorated by the title company. When documents are conveyed to the lead agency, the counties typically change the parcels to tax-exempt status as of July 1st in the year following recording. If this does not occur, Real Property staff contacts the county assessment office, and the matter can be quickly resolved.

5.12 Condemnation

Every effort will be made to acquire real property by negotiated purchase, donation, or by dedication. No property owner will be required to surrender possession of real property without receiving the fair market value and just compensation to which they may be entitled. In the event that an agreement cannot be reached through negotiation, the lead agency may initiate eminent domain proceedings in accordance with Oregon or Washington law.

A discussion between the acquisition contractor, Real Property staff, legal staff, and the project manager will be held prior to initiating eminent domain proceedings, in order to determine if any other alternative solutions may bring about a resolution to the issues.

5.13 Alternative Dispute Resolution (ADR)

Alternative Dispute Resolution is focused on facilitating resolution through mediation. This approach to resolving acquisition issues is in place at TriMet and is not used by WSDOT, so would only be used in cases where TriMet is the lead agency on the acquisition. When applicable the property owner will be encouraged to work together with the participating lead agency and it's consultants to solve the issues and to reach a constructive agreement and to use mediation if it is appropriate. Through the mediation process, the lead agency and the property owner agree to utilize the services of an independent mediator to facilitate resolution. The mediator does not impose a decision but works with each party to create a settlement. It is a voluntary process that usually results in an agreement. A significant result of this type of resolution is the cooperative effort to reach an agreement. There is also no requirement for the property owner to bring an attorney to defend his or her position. If dispute resolution is unsuccessful, it may be necessary to initiate condemnation in accordance with Oregon or Washington law.

5.14 Initiation of Eminent Domain Proceedings

Eminent domain proceedings are initiated by submitting a condemnation resolution to the lead agency’s Board for approval. Depending on the sequencing of acquisition, resolutions authorizing condemnation may be prepared for either individual parcels or groups of parcels. The resolution is prepared by the Legal Services Department, or the State AGO, which also provides assistance in presenting the resolution and securing approval. At least 40 days before filing a condemnation action, the lead agency must make a statutory written offer to purchase the property for the full amount of just compensation. It is a prerequisite of the exercise of eminent domain to first attempt to agree with an owner as to the reasonable value of the property, unless the owner is concealed or cannot be found. All reasonable attempts to negotiate a settlement will be pursued prior to litigation.

5.15 Management of Condemnation Cases

The eminent domain proceedings will be managed by the lead agency's Legal Services and the Real Property Department, using staff and outside legal counsel as necessary. Upon Board approval and FTA concurrence if required, the Real Property Acquisition Manager will furnish all relevant documentation to Legal Services for commencement of eminent domain proceedings. Real Property will provide all necessary support for presenting evidence reflecting the lead agency's position as to establishing just compensation, attempts to negotiate settlement, etc. Legal Services and the Real Property Department will maintain all records and keep Project staff informed as to the progress of cases.

5.16 Demolition

Some parcels acquired for Project construction may contain structures and other improvements that must be demolished and removed prior to the start of construction. Neither demolition nor construction activities may begin until occupant relocation has been completed. Demolition will be carried out in such manner as to comply with all applicable regulations regarding environmental protection, minimization of neighborhood and traffic disruption. Some demolition may be carried out as work items within line segment construction contracts. Lead agency staff will bid and award demolition contracts separately as necessary to accommodate early acquisition or other needs.

This page left blank intentionally.

6. Relocation Process

Any relocations that may be required will be conducted in compliance with the federal law and regulations cited previously, the Oregon and Washington statutes and TriMet and WSDOT's Relocation Policy. Planning for relocation will allow for specialized needs of businesses, hardship cases, and individual situations in order to provide the appropriate assistance to displacees. Relocation activities will be conducted by either lead agency staff or by contracted agents. Relocation forms and documents are essentially the same as those used by the Oregon Department of Transportation Right of Way Section, modified to meet TriMet's needs.

Typically, two agents are needed to complete the relocation process, although one of the agents may also be the acquisition agent. On a residential relocation, one agent will prepare the relocation benefit study. The benefit study is approved by the project manager and also by the lead agency's Real Property Manager, or his/her designee. Either a second relocation agent or the acquisition agent notifies the displacee of the benefits, and provides relocation advisory services.

Residential displacees must be offered comparable replacement housing. The term "comparable replacement housing" means any dwelling that is:

A. Decent, safe, and sanitary

B. Adequate in size to accommodate the occupants

C. Within the financial means of the displaced person

D. Functionally equivalent

E. In an area not subject to unreasonable adverse environmental conditions; and

F. In a location generally not less desirable than the location of the displaced person's dwelling with respect to public utilities, facilities, services, and the displaced person's place of employment.

To assure that adequate replacement housing is available, a review of the *Oregonian* and The (Vancouver) *Columbian* classified advertisements will be conducted, as well as a review of the local Multiple Listing Service offerings and Craigslist. The results should indicate that adequate replacement housing would be available in the Portland-Vancouver area, or else additional steps must be taken to mitigate the impact. There is substantial reason to expect that a number of replacement properties will continue to be available as the acquisition process progresses.

Assistance in locating replacement sites for businesses and using financial or technical assistance programs, which may require the cooperation of local agencies, will be coordinated through the Real Property Acquisition Manager.

The major aspects of the relocation program are summarized below.

6.1 Notification to Property Owners and Tenants

Most of the affected property owners will be contacted during preliminary engineering of the Project. Concurrent with the initiation of appraisals on parcels, business and residential owners and tenants will be formally notified of the planned acquisition and will receive written information on the relocation benefits, eligibility criteria, and services offered. Relocation agents will meet with affected owners and tenants to ascertain specific needs and explain the relocation program as part of the acquisition procedure.

6.2 Appeals

All displacees have the right of appeal as to their eligibility for, or the amount of, payment for any relocation benefit. The right of appeal shall be described in information distributed at public meetings and to individual displaces as part of the information delivered at the initial relocation benefit meeting. If necessary the displaced party is provided with a copy of the Appeal of Relocation Assistance form. TriMet and WSDOT both have a formal process in place to address relocation appeals.

6.3 Payment of Relocation Benefits

The Real Property Acquisition Managers or relocation agents will prepare relocation assistance claims, and process them according to existing federal guidelines. Payment of relocation benefits will be made directly by the lead agency.

6.4 Notice to Vacate

Each displaced owner and tenant will be provided a 90-day assurance in conjunction with the offer to purchase property or the offer of relocation benefits.

6.5 Property Owner Relations and Community Relations

The Project is a highly visible public works project and will generate ongoing interest among the public and the press. To ensure consistent information and to facilitate dependable lines of communication with the public, the lead agencies organized a focused Community Relations effort for the Project.

Property owners deserve special consideration in the public involvement effort. The Real Property staff serves as the primary contact in providing information about the property needed for the Project, acquisition procedures in general, and specific information about their property, and their rights under applicable laws throughout the appraisal, acquisition, relocation, and construction phases of the Project. As part of the Draft Environmental Impact Statement process, all property owners with potential impacts have already been notified and many have had multiple contacts with CRC Project staff.

The Community Relations staff provides the citizens of the Portland-Vancouver region and the Columbia River Crossing Corridor with information about the Project's activities and assistance when coordinating with the Project staff. The Community Relations staff will ensure that the

Project realizes the public's vision of its role in serving community needs and avoiding disruptive or harmful effects on the neighborhoods and businesses along the route.

This will be accomplished through a multitude of community relations activities designed to:

- Build broad public awareness of, and support for, the Project as an essential contributor to the region's economy and livability.
- Establish ongoing communications with organized neighborhood and commercial groups in the project area, leading to mutual trust.
- Work directly with residents, businesses, and property owners along the route to resolve problems.
- During construction, provide information to allow affected properties and transportation system users to perceive and experience as little inconvenience as possible.
- Direct specific questions regarding property acquisition to Real Property staff.

Community Relations activities for the Project can be categorized into two main groups:

1. Activities that focus on individual residents, property owners, and businesses directly affected by the design of the Project, its location or the process of construction; and

2. Activities that build understanding of, and support for, the Project within broader, community-wide audiences.

Project information will be readily available to interested parties upon request. Information available may include details of the overall Columbia River Crossing Light Rail Project, the real estate process in general, and information about the rights of a property owner or displacee under the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act. The Acquisition and Relocation brochure will be provided to all affected parties.

This page left blank intentionally.

7. Other Components

7.1 Scheduling, Reporting, and Recordkeeping

7.1.1.1 Scheduling

The Real Property Acquisition Manager is responsible for developing and maintaining a schedule of projected dates for various stages of property acquisitions as determined by construction management staff. The schedule will be updated regularly. This schedule information will also be coordinated with Legal, Fiscal, and Program Management staff to determine the timing of expenditures for financial control and reporting purposes.

7.1.2 Reporting

Periodic reports summarizing the status of real estate acquisition activities will be prepared for internal use. Summary reports for Board review or other management review will be prepared as required. The FTA quarterly reports will contain a section documenting the current acquisition and relocation program status.

7.1.3 Recordkeeping and Document Control

The Real Property staff will maintain working files for each acquisition, including the recorded deed, title insurance, appraisal, appraisal review, owner contact records and other property records.

The CRC Project, WSDOT, ODOT and TriMet already have document control systems in place. Pertinent documents will be copied to Document Control for archiving and for entering in the project databases.

7.2 Property Management

The Real Property staff, in coordination with engineering, construction management and legal staff will manage properties acquired for the Project. Upon acquisition, the Real Estate Manager will ensure all properties are managed in accordance with risk management policies and procedures.

Property management may include:

- Interim or short-term leases for continued use of a building until it is needed for construction.
- Fencing and securing of vacant parcels or structures.
- Maintenance of land or structures per health, safety and local code requirements.
- Coordination with contractors who might use acquired properties and structures as field offices or materials storage sites.
- Oversight of property disposition after completion of construction.

When each property is vacated, it will be inspected and arrangements will be made to disconnect utilities and secure the property. The lead agency may use contracted services for some property management functions. Some independent contracts for fencing, hauling, weed abatement, security patrols, and related services may also be required. Lead agency staff will be responsible for coordinating all aspects of property management until such time as it is turned over to the contractor for construction.

The security of any leased equipment, facilities, or any other leased structure on TriMet or WSDOT property will be the sole responsibility of the Lessee until the lease termination becomes effective. Construction contractors will be responsible for security of all leased materials, equipment, supplies and construction sites.

7.3 Easement, Lease, and License Agreements

Existing utilities or other facilities that cross TriMet or WSDOT property will be documented in engineering drawings. Easements or other crossing rights will be identified during the appraisal and title search phase of acquisition. Any agencies or companies with facilities on property to be acquired by TriMet or WSDOT will be contacted to inform them of the change of ownership. Upon acquisition of non-railroad properties, any easement, lease, or license agreement specifying rights and responsibilities for those facilities will be executed and maintained as part of TriMet's or WSDOT's permanent real estate records.

7.4 Disposal of Excess Property

When real property is no longer needed, it will be disposed of in accordance with FTA and TriMet or WSDOT property disposition policies. Use and disposal of acquired properties will be examined in conjunction with the station area development and joint development efforts on the Project to determine whether there are opportunities for use of TriMet or WSDOT property in a development project. Following are options for disposal of property:

- Acquire clear title by compensating FTA for its share in the property. FTA's share is calculated by applying the Federal Percentage of Participation in the cost of the approved project to the appraised fair market value of the property at the time of the disposal.
- Market and competitively sell the property and pay FTA its share of the fair market value of the property.
- Transfer the property to another grantee for use in a different FTA project without reimbursement of funds to FTA. This involves acquisition by the transferee of the transferor's proportional interest in the appraised fair market value of the property, and assumption of liability for any continuing FTA interest therein.
- Transfer of property for other public use, consistent with the provisions of 49 USC § 5334(g).

Recorded survey maps of TriMet and WSDOT owned properties would be maintained as part of the permanent project records. An inventory listing pertinent information on each property will be prepared and reviewed periodically to determine whether properties should be sold. All property will also be listed on the bi-annual FTA property inventory showing property acquired or disposed of during the reporting period. The Real Property staff, in cooperation with Legal Services and the Land Development Manager of joint development, will coordinate transactions on the sale of TriMet and WSDOT property.

7.5 Transit-Oriented and Joint Development

FTA encourages transit systems to undertake joint development projects at and around transit stations where such projects are physically or functionally related to the provision of transit service, and where they increase transit revenues through proceeds from the joint development.

FTA has established a policy that encourages transit agencies to initiate joint development projects. This policy recognizes the benefit of higher density, transit-oriented development to the operation of the LRT system. TriMet and C-TRAN will work in partnership with the property owners and local jurisdictions to produce transit supportive development projects. Complementary efforts will include joint development funding, technical assistance, and community outreach.

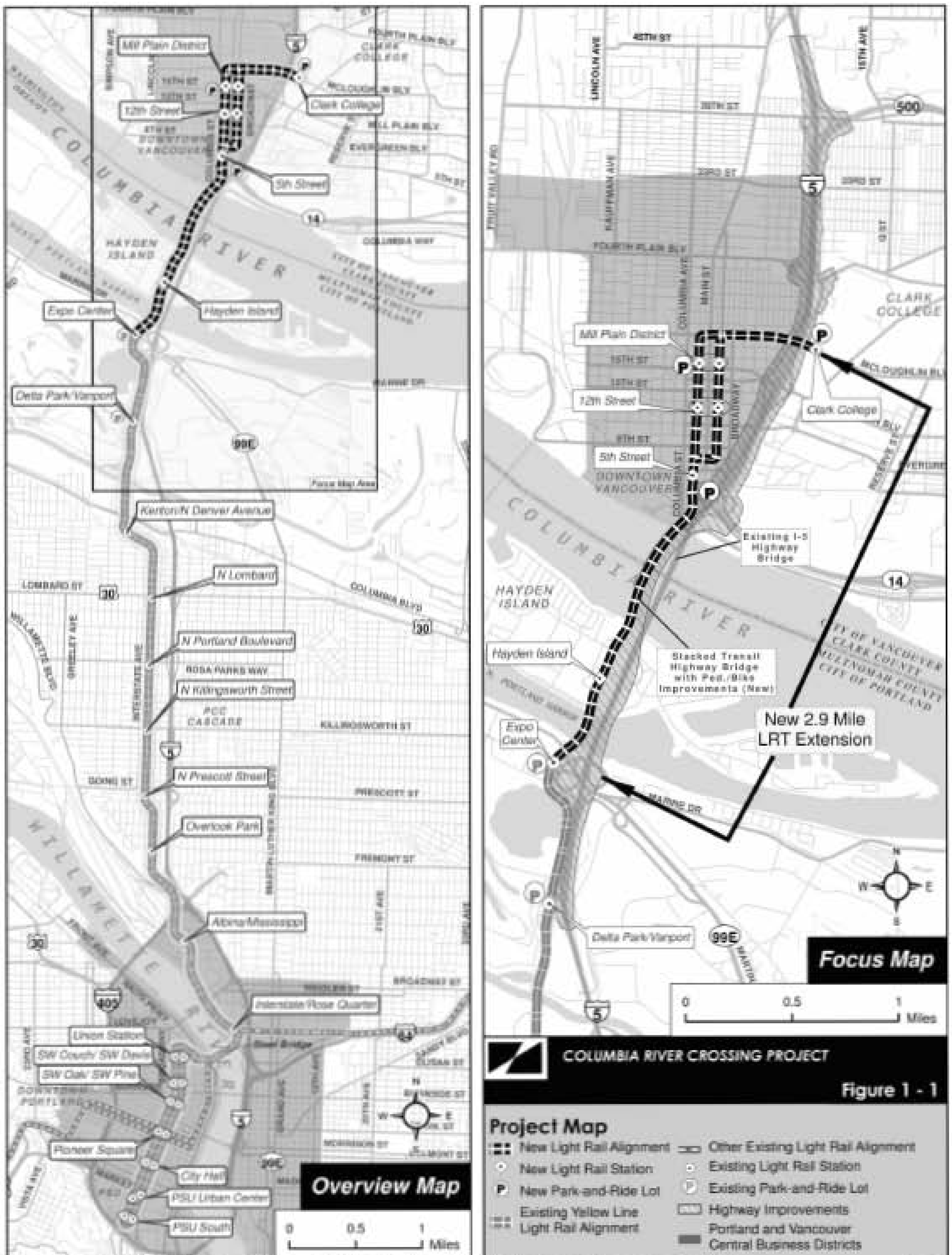
The CRC Project goal of station area planning is to promote “transit supportive” development near LRT stations. Transit supportive is defined as higher density, pedestrian-friendly development that encourages use of transit as an alternative to the automobile. Achieving transit supportive development along the Columbia River Crossing Corridor will involve partnerships with TriMet, C-TRAN, Cities of Portland and Vancouver, Clackamas County, Clark County, Metro, RTC, neighborhood and business associations, developers, financial institutions, and other public and private interests.

This page left blank intentionally.

EXHIBITS

This page left blank intentionally.

Appendix A. Columbia River Crossing LRT Map

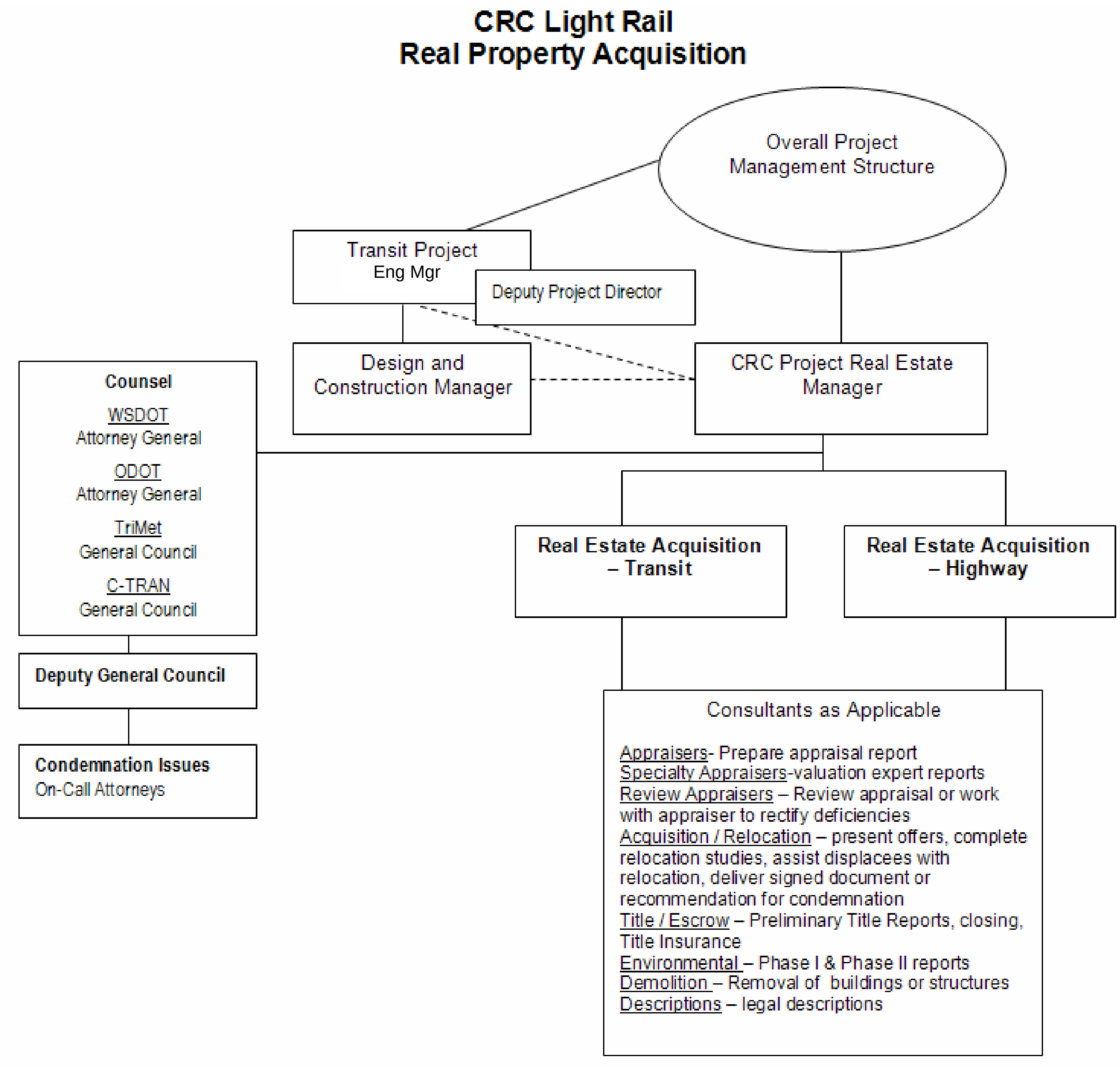


*Note: Stations and Light Rail Transit alignment from the Steel Bridge to PSU South are currently under construction as part of the 1.8-mile Portland Mall Light Rail Project. Upon completion in September of 2009, these stations will serve Green and Yellow line trains.

06/21/08

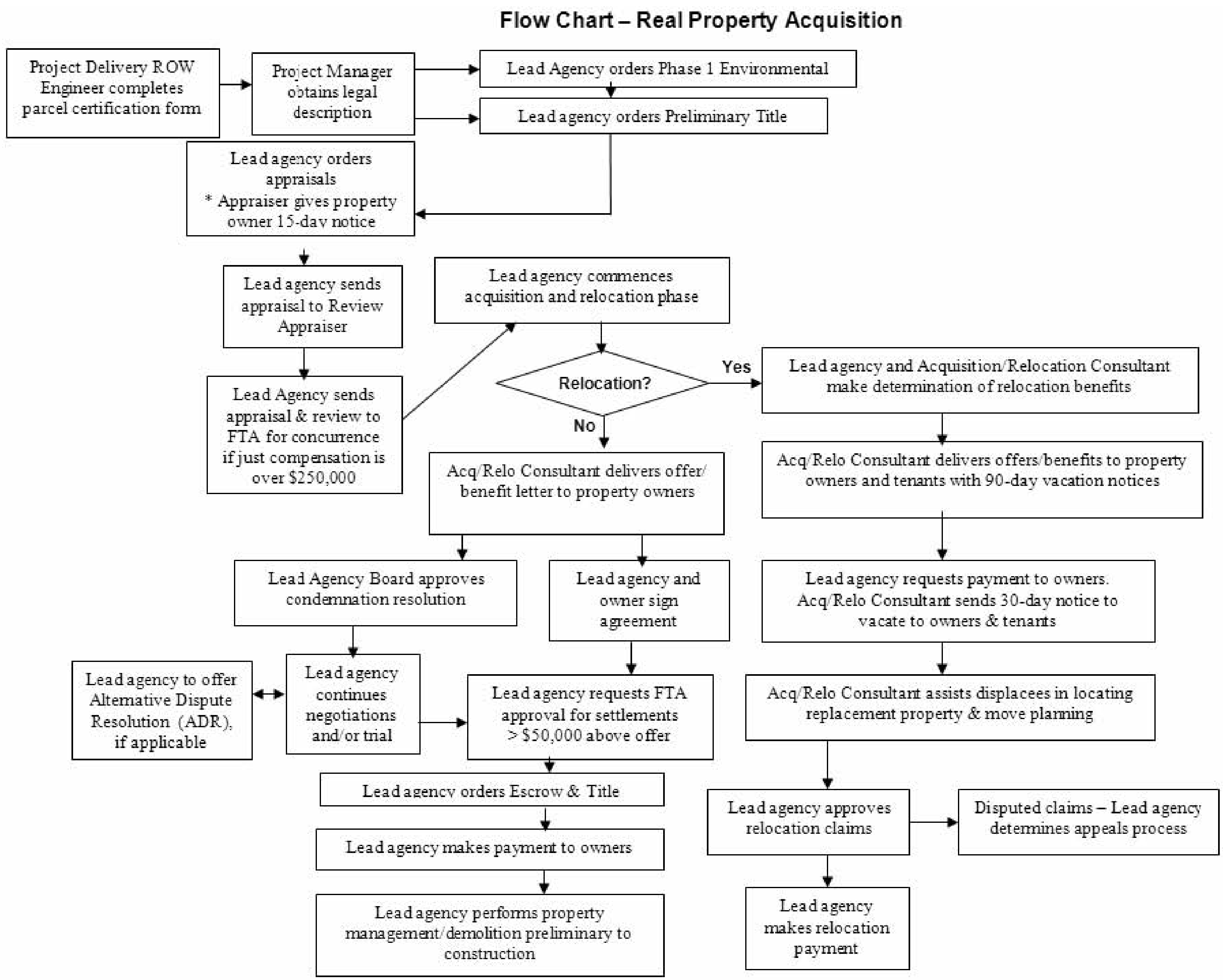
This page left blank intentionally.

Appendix B. Organizational Chart



This page left blank intentionally.

Appendix C. Flow Chart – Real Property Acquisition



This page left blank intentionally.

Appendix D. Lead Agency by Property Type and Location

Property Location	**Oregon**		**Washington**	
Acquisition Needed for:	Highway/Bridge	Transit	Highway/Bridge	Transit
Lead Agency	ODOT*	TriMet	WSDOT	WSDOT
Acquisition generally follows standard practices of:	ODOT	TriMet	WSDOT	TriMet
Land ultimately in control of:	ODOT	TriMet	WSDOT	C-TRAN
In case of failure to reach acquisition agreement condemnation proceeds if approved by:	ODOT	TriMet Board of Directors	WSDOT	WSDOT
Alternative Dispute Resolution available as an option?	Yes	Yes	No	No

* All parcels that include partial or full acquisition as a result of the highway component of the project, will be acquired by the highway lead agency.

Appendix E. Acquisition Timeline

Real Property Acquisitions Timeline

1. ***Preliminary***
   General Information Notice - 1 week
   Title Reports - 1 month
   Phase1 Environmental - 2 months
   Total - 3 months

2. ***Appraisal***
   Review descriptions - 1 week
   Request appraisal bids - 2 weeks
   Award bid, contract, info sent - 1 week
   Appraisal (includes 15 day notice) - 2 months
   Review and send to reviewer - 3 weeks
   Send to acquisition contractor with information - 1 week
   Total 4 months

3. ***3. Acquisition***
   Review file, contact owner - 3 weeks
   Negotiate (40 day minimum by Oregon law) - 2 months
   Closing - 1 month
   Total 4 months

4. ***4. Relocation***
   Notice given (concurrent with offer) - 3 months
   Additional time to move - 6 months
   Total 9 months

5. ***5.Possession Through Condemnation***
   Board approval, file transfer
   Filing, possession hearings
   Total 1 month

6. ***6. Demolition***
   2 to 3 months (if needed)

Appendix F. Acquisitions and Acquisition Type - Transit Component of the CRC Project and the Expansion of the Ruby Junction Facility

Transit Component of the CRC Project						
Parcel ID	**Ownership**	**Address ** Indicates Owners mailing address. Otherwise address shown is the property's physical address**	**City, State**	**Property Type**	**Full Acquisition**	**Partial Acquisition**
59	Washington State	1800 E. McLoughlin Blvd., Vancouver, Wa 98663	Vancouver, WA	Parking, Clark College Facility	X	
60	Washington State	1800 E. McLoughlin Blvd. Vancouver, Wa 98663	Vancouver, WA	Baseball fields		X
61	City of Vancouver	1009 E. McLoughlin Blvd Vancouver, Wa 98663	Vancouver, WA	Community center		X
166	First Interstate Bank	1800 Main Street Vancouver, Wa 98660	Vancouver, WA	Bank		X
167	First Interstate Bank	1800 Main Street Vancouver, Wa 98660	Vancouver, WA	Bank		X
183	Kenyon	605 E. McLoughlin Blvd. Vancouver, Wa 98663	Vancouver, WA	Residence		X
201	Holland Inc	109 W. 17th Street Vancouver, Wa 98660 **	Vancouver, WA	Parking lot		X
216	Central Wood Prod	1514 Main Street Vancouver, Wa 98660	Vancouver, WA	Parking lot	X	
217	Central Wood Prod	1506 Main Street Vancouver, Wa 98660	Vancouver, WA	Parking lot	X	
218	Central Wood Prod	500 E. Broadway, #110 Vancouver, Wa 98660 **	Vancouver, WA	Parking lot	X	
219	Central Wood Prod	500 E. Broadway, #110 Vancouver, Wa 98660 **	Vancouver, WA	Parking lot	X	
220	Central Wood Prod	500 E. Broadway, #110 Vancouver, Wa 98660 **	Vancouver, WA	Parking lot	X	

221	Central Wood Prod	500 E. Broadway, #110 Vancouver, Wa 98660 **	Vancouver, WA	Parking lot	X	
233	Amberhill Properties	114 E. 7th Street Vancouver, Wa 98660	Vancouver, WA	Parking lot		X
242	Amco Vancouver LLC	412 W. Washington Street Vancouver, Wa 98660	Vancouver, WA	Parking lot		X
243	Amco Vancouver LLC	400 W. Washington Street Vancouver, Wa 98660	Vancouver, WA	Parking lot		X
251	Amco Vancouver LLC	111 SW. 5th Avenue, #1000 Portland, Or 97204 **	Vancouver, WA	Parking lot		X
252	BNSF Railroad	P.O. Box 961089 Fort Worth, Tx 76161 **	Vancouver, WA	Railroad		X
272	Thunderbird Hotel LLC	P.O. Box 82448 Portland, Or 97282-1401 **	Portland, OR	Hotel		X
283	Jantzen Beach Moorage Inc	1881 N. Jantzen Ave Portland, Or 97217-1521	Portland, OR	Commercial		X
284	Larson Oliver C Tr	8320 NE Highway 99 Vancouver, Wa 98665-8819 **	Portland, OR	Marine industrial		X
289	"State of Oregon Leased to: Diversified Marine I"	355 Capitol St. NE Salem, Or 97301 **	Portland, OR	Marine industrial		X
295	Hayden Corner LLC	P.O. Box 25716 Portland, Or 97298-0716 **	Portland, OR	Restaurant	X	
296	Portarthur LLC	1405 Jantzen Beach Ctr Portland, Or 97217-1500	Portland, OR	Office supply store, restaurant		X
297	Jantzen Dynamic Corp	1405 Jantzen Beach Ctr Portland, Or 97217-1500	Portland, OR	Shopping center		X

298	Jantzen Dynamic Corp	1405 Jantzen Beach Ctr. Portland, Or 97217-1500	Portland, OR	Shopping center		X
299	Columbia Crossing LLC	Unknown	Portland, OR	Private road		X
Ruby Junction Facility Expansion						
Parcel ID#	**Ownership**	**Address - ** indicates Owner's mailing address. Otherwise, address shown is the property's physical address**	**City, State**	**Property Type**	**Full Acquisition**	**Partial Acquisition**
1	Dodd, Joseph	2227 NW Eleven Mile Avenue	Portland, OR			X
2	Suran, Rick	1702 NW Eleven Mile Avenue	Portland, OR	Shop/garage	X	
3	Quintana, Song Tuk	1722 NW Eleven Mile Avenue	Portland, OR	SFR	X	
4	Agoposa, Julianna	1806 NW Eleven Mile Avenue	Portland, OR	Shop/garage	X	
5	Fugmann, Darrel	2127 NW Eleven Mile Avenue	Portland, OR	Shop/garage	X	
6	Fugman, Perry	2103 NW Eleven Mile Avenue	Portland, OR	Residential Conversion?	X	
7	Fugman, Perry	2019 NW Eleven Mile Avenue	Portland, OR	SFR	X	
8	Kirkpatrick	2005 NW Eleven Mile Avenue	Portland, OR	SFR	X	
9	Rossomondo	1955 NW Eleven Mile Avenue	Portland, OR	Industrial	X	
10	Rossomondo	1919 NW Eleven Mile Avenue	Portland, OR	Industrial	X	
11	Clark	1815 NW Eleven Mile Avenue	Portland, OR	Industrial	X	
12	Tash, RJ Co.	1825-1843 NW Eleven Mile Avenue	Portland, OR	Shop/garage	X	
13	Hammack, Timothy	1753 NW Eleven Mile Avenue	Portland, OR	SFR	X	
14	Hughes, michael	1717 NW Eleven Mile Avenue	Portland, OR	Industrial	X	
15	Wagoner Properties	1709 NW Eleven Mile Avenue	Portland, OR	Industrial	X	

This page left blank intentionally.

Appendix G. Sample of Available Housing

The Oregonian**

Type of Housing	Number of advertisements
SE Portland	
Apartments for rent SE Portland	
Mobile Homes for rent SE Portland	
Duplex for rent SE Portland	
Houses for rent SE Portland	
SW Portland	
Apartments for rent downtown	
Houses for rent SW Portland	

RMLS (Multiple Listing Service)

Listings as of in the surrounding

zip codes of the SE displaced properties

price range $

**Later issues of the Oregonian suggested similar results

This page left blank intentionally.

Appendix H. Position Descriptions

Job Status: Non-Union

Job Description

FLSA Status: Exempt
Grade: 13

Title:	Real Property Specialist	**Division:**	Capital Projects & Facilities
Report	Manager, Real Property Acquisition	**Department:**	Project Planning

Summary Description:
Negotiate acquisition and disposal of real property for TriMet construction projects. Provide liaison, appraisal, relocation, property management, and demolition services. Perform related duties as required.

Essential Functions:
1. Conduct/coordinate comprehensive negotiations with individual property owners and tenants for fee acquisition, easement, lease or permit of entry for residential, business, and publicly owned property required for transit projects.

2. Conduct/coordinate liaison activities prior to acquisition. Meet with potentially affected property owners, tenants and public agencies relative to acquisition issues.

3. Conduct/coordinate property management and disposal of acquired property with existing improvements. Conduct environmental contamination investigations and related remediation to clear project property for certain construction.

4. Prepare opinions of value, administrative determinations, value findings, and other appraisals as directed. Develop costing estimates, environmental analysis, and planning for design purposes.

5. Prepare and/or coordinate relocation plan. Provide relocation assistance to individuals, businesses and public agencies. Process relocation claims. Prepare documentation for and participate in relocation appeal hearings as required.

6. Provide research and review for appraisal reports, property files, engineering drawings, environmental reports, construction specifications, and other materials necessary to begin negotiation for real property.

7. Inspect properties and verify data in support of appraisals, design, environmental impact, construction, and property management/disposal activities.

8. Participate in coordination meetings with other departments, outside agencies, community meetings, and public hearings.

9. In the absence of Real Property Acquisition Manager, may perform other duties as required.

Prerequisites:
Associate's degree in Business, Public Administration, Planning or related field. Course work in real property appraisal, acquisition, relocation, property management, or other relevant training desired.

Five years experience in real property acquisition, including appraisal or appraisal assistance and relocation, within a public sector environment. Experience in the same disciplines on transit, highways, and/or utility projects desired. Possession of a valid driver's license.

Or any equivalent combination of experience and training.

Selection Criteria:

1. Demonstrated knowledge of applicable federal, state and local laws and regulations for publicly funded real property transactions.

2. Knowledge of principles and practices of real property appraisal, acquisition, relocation, condemnation, and disposal in a public sector context.

3. Knowledge and understanding of real property and the right-of-way design location and legal description process, including skill in interpreting engineering design drawings and legal descriptions.

4. Demonstrated ability to sensitively and successfully work with affected property owners, businesses, and public agencies in negotiating property acquisition through settlement or condemnation.

5. Demonstrated ability to analyze, interpret, and apply complex appraisal, acquisition, relocation, and property management/disposal procedures according to applicable laws and regulations.

6. Ability to maintain organized accurate records.

7. Ability to communicate clearly and effectively orally and in written form.

8. Ability to operate a computer and supporting software applications.

9. Ability to establish and maintain good working relationships with employees, management, outside agencies, and the general public.

Date: **Authorized by:**

Date: **Human Resources:**

The above description is intended to identify the essential functions and requirements for the performance of this job. It is not to be construed as a complete statement of duties, responsibilities or requirements.

Job Status: Non-Union

Job Description

FLSA: Exempt

Grade: 14

Title: Real Property Acquisition Manager

Division: Capital Projects & Facilities

Report to: Director of Project Delivery Engineering Support

Department: Project Planning

Summary Description:

Manages the real property acquisition and disposition for TriMet projects. Facilitates right of way and real property location design, project costing, budget development, appraisal, negotiation, relocation, condemnation and settlement, and property management. Performs related duties as required.

1. Develop property appraisal strategies and approaches prior to and throughout negotiations. Coordinate property appraisals and the appraisal process.
2. Provide guidance and direction to engineering design team in developing defendable right of way and real property location design, setting right of way definition, and identifying related residential and business displacements Work closely with legal staff and outside counsel to secure possession and title of real property needed for construction projects.
3. Develop staffing needs, budgets, schedules, and coordination plans required to acquire and clear right of way and real property relative to construction time lines.
4. Manage negotiation of property access in advance of acquisition for staff and consultant design team needs, e.g., survey, wetland delineation, geotechnical and hazardous material investigation, and site inspection.
5. Initiate development of acquisition/condemnation resolution packet for Board approval. Facilitate development of Federal Transportation Agency (FTA) concurrence packets and coordinate timely FTA response.
6. Manage excess property and appraisal, lease, and sale of surplus property.
7. Represent TriMet on acquisition or related matters to members of the community, local, state, and federal agencies.

Prerequisites:

Bachelor’s degree in Real Estate, Business Administration, Public Administration, Planning or related field.

Eight years experience in real property acquisition, preferably within a public sector environment, which includes management/supervisory experience of professional, and support staff, and consultants.

Or any equivalent combination of training and experience.

Selection Criteria:

1. Demonstrated knowledge of effective management and supervisory practices.
2. Demonstrated knowledge of standards used in real property appraisal, acquisition, condemnation, relocation, and property management and disposal in federally funded projects.
3. Demonstrated knowledge of federal, state, and local laws, Federal Transit Administration (FTA) guidelines, and the Uniform Act as they relate to real property issues.

4. Demonstrated knowledge of right of way and real property design location and legal description process necessary to produce drawings and documents for appraisal and acquisition.

5. Demonstrated knowledge of various types of environmental contamination investigation and remediation necessary to support accurate property appraisals.

6. Skill in effecting timely acquisition and clearing of essential right of way and real property to meet multiple construction contract deadlines.

7. Demonstrated knowledge of available funding sources and approval processes related to property appraisal and acquisition.

8. Ability to effectively communicate in both oral and written form.

9. Ability to operate a personal computer and appropriate business software applications.

10. Ability to establish and maintain good working relationships with employees, managers, consultants, jurisdictional representatives, and the general public.

Date: **Authorized by:**

Date: **Human Resources:**

The above description is intended to identify the essential functions and requirements for the performance of this job. It is not to be construed as a complete statement of duties, responsibilities or requirements.

Appendix N

Schedule

This page left blank intentionally.

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
CRC Project Baseline 2008 09-01			269...	08-15-08 A	04-04-19	0d			
PRE-CONSTRUCTION			212...	08-15-08 A	01-06-17	571d			
PROJECT MANAGEMENT			755d	09-02-08	08-17-11	108d			
PM General			0d	09-02-08	09-02-08	0d			
PM1010	5d/Wk ...	Begin Task AF	0d	09-02-08		0d			TP1510, TP1410, TP1740, RE1110, RE1010, AL1120, AL1130, AL1140, AR1...
Key Decisions			210d	09-02-08	06-26-09	6d			
KD1110	5d/Wk ...	Number of Lanes Decision Period (3/6/09A)	131d	09-02-08	03-06-09	20d		PM1010	SW1110, EN0210, AL1170, AM1500, EN2610
KD1120	5d/Wk ...	Marine Drive Interchange Alignment Prep Period - Initial Info Handoff	135d	09-02-08	03-12-09	11d		PM1010	SW1110, UT1300, AL1170, AM1500, KD1150
KD1130	5d/Wk ...	SR500 / Fourth Plain I/C Alignment Prep Period - Initial Info Handoff	135d	09-02-08	03-12-09	11d		PM1010	KD1160, AM1500, AL1170, SW1110, UT1300
KD1140	5d/Wk ...	Number of Bridges Decision Period	171d	10-27-08	06-26-09	6d		PM1010, ST0550	SW1110
KD1150	5d/Wk ...	Marine Drive Interchange Alignment Decision Period	35d	03-13-09	04-30-09	11d		KD1120, TP1410	EN0210, DD1140
KD1160	5d/Wk ...	SR500 / Fourth Plain I/C Alignment Decision Period	35d	03-13-09	04-30-09	11d		TP1410, KD1130	EN0210, DD1140
CEVP (Cost Estimate Validation Process)			701d	11-17-08	08-17-11	108d			
PM1110	5d/Wk ...	Prepare Quantities for CEVP #2	10d	11-17-08	12-01-08	49d		AL1150	PM1120
PM1120	5d/Wk ...	CEVP Preparation & Advanced Risk Elicitation #2	38d	12-08-08	01-30-09	45d		PM1010, PM1110	PM1130
PM1130	5d/Wk ...	CEVP Workshop #2	5d	02-02-09	02-06-09	45d		PM1120	TR0890, PM1140
PM1140	5d/Wk ...	CEVP Post WS#2 Cost & Schedule (Cash Flow) Risk Modeling	60d	02-09-09	05-01-09	45d		PM1130	FN1500, PM1210, EN0230
PM1210	5d/Wk ...	CEVP Preparation & Advanced Risk Elicitation #3	60d	07-21-10	10-13-10	108d		EN4900, PM1140	PM1250
PM1250	5d/Wk ...	CEVP Workshop #3	5d	10-14-10	10-20-10	108d		PM1210	PM1310
PM1310	5d/Wk ...	CEVP Preparation & Advanced Risk Elicitation #4	60d	05-17-11	08-10-11	108d		PM1250	PM1350
PM1350	5d/Wk ...	CEVP Workshop #4	5d	08-11-11	08-17-11	108d		PM1310	AA1110
Communications			285d	12-02-08	01-15-10	61d			
CM1110	5d/Wk ...	Open House	0d		12-02-08	61d		PM1010	CM1120
CM1120	5d/Wk ...	Open House	0d		12-03-08	61d		CM1110	CM1130
CM1130	5d/Wk ...	Transit Workshop (Vancouver) (1/10/09A)	0d		01-09-09	61d		CM1120	CM1140
CM1140	5d/Wk ...	Transit Workshop (Vancouver)	0d		01-14-09	61d		CM1130	CM1150
CM1150	5d/Wk ...	Q & A Session (Number of Lanes)	0d		01-21-09	61d		CM1140	CM1160
CM1160	5d/Wk ...	Q & A Session (Number of Lanes) (1/24/09A)	0d		01-23-09	61d		CM1150	CM1200
CM1200	5d/Wk ...	Open Houses (4 total)	12d	06-15-09	06-30-09	61d		CM1160	CM1400
CM1400	5d/Wk ...	Tolling Outreach	150d	06-15-09	01-15-10	61d		CM1200	EN4460
TRANSPORTATION PLANNING (Traffic)			320d	09-02-08	12-02-09	91d			
2030 FEIS Traffic Forecast & Analysis			108d	02-06-09	07-09-09	17d			
TP1110	5d/Wk ...	2030 Model Run	53d	02-06-09	04-21-09	13d		TR0780	TP1120, TP1310
TP1120	5d/Wk ...	2030 Post Processing	15d	04-22-09	05-12-09	17d		TP1110	TP1130, TP1140, FN1500, TP1210
TP1130	5d/Wk ...	2030 Tolling Analysis	15d	04-29-09	05-19-09	28d		TP1120, TR1260	TP1950, TR1360
TP1140	5d/Wk ...	2030 VISSIM Analysis	15d	05-13-09	06-03-09	17d		TP1120	TR1360, TP1150, EN0280
TP1150	5d/Wk ...	2030 Syncro/Sim Traffic Analysis	22d	05-13-09	06-12-09	17d		TP1140	TP1160, TP1950, TP1520
TP1160	5d/Wk ...	2030 Transit Station Analysis	30d	05-28-09	07-09-09	17d		TP1150	TP1950, EN0300, EN4100
5.5 - 2035 Traffic Forecast & Analysis			45d	05-20-09	07-23-09	18d			
TP1210	5d/Wk ...	2035 Model Run	10d	05-20-09	06-03-09	18d		TP1120	TP1220
TP1220	5d/Wk ...	2035 Post Processing	15d	06-04-09	06-24-09	18d		TP1210	TP1240
TP1240	5d/Wk ...	2035 VISSIM Analysis	15d	06-25-09	07-16-09	18d		TP1220	TP1250
TP1250	5d/Wk ...	2035 Syncro/Sim Traffic Analysis - Ramp Terminals	20d	06-25-09	07-23-09	18d		TP1240	TP1950
5.6 - Opening Year Traffic Forecast & Analysis			68d	04-29-09	08-04-09	20d			
TP1310	5d/Wk ...	Open Year Model Run	20d	04-29-09	05-27-09	13d		TP1110	TP1320
TP1320	5d/Wk ...	Open Year Post Processing	15d	06-09-09	06-29-09	5d		TP1310, TR1250	TP1340, FN1500
TP1340	5d/Wk ...	Open Year VISSIM Analysis	25d	06-30-09	08-04-09	20d		TP1320	TP1350
TP1350	5d/Wk ...	Open Year Syncro/Sim Traffic Analysis - Ramp Terminals	25d	06-30-09	08-04-09	20d		TP1340	TP1950
5.8 - Traffic Analysis of Alternative Configurations			170d	09-02-08	04-30-09	11d			
TP1410	5d/Wk ...	Alt Config's Analysis w/ # Lanes Decision	170d	09-02-08	04-30-09	11d		PM1010	TR0780, KD1150, KD1160
5.9 - Traffic Operations Analysis of Alt HCT Alignments & Park-n-...			260d	09-02-08	09-08-09	6d			
TP1510	5d/Wk ...	Operations Syncro/Sim Traffic Analysis - Downtown	230d	09-02-08	07-27-09	6d		PM1010	TR0620, TP1950, TP1520
TP1520	5d/Wk ...	Operations VISSM Analysis - Downtown - AF5008	30d	07-28-09	09-08-09	6d		TP1150, TP1510	TP1950, EN4100
5.18 - FEIS Preparation			240d	09-02-08	08-10-09	41d			
TP1740	5d/Wk ...	Prepare Responses to DEIS Comments - AF5010	240d	09-02-08	08-10-09	41d		PM1010	EN4100
Traffic Tech Report			80d	08-11-09	12-02-09	91d			
TP1950	5d/Wk ...	Prepare Draft Traffic Tech Report	30d	08-11-09	09-22-09	6d		TP1160, TP1150, TP1350, TP1510, TP1520, TP1250, TR1060, TP1130	EN4100, TP1980
TP1980	5d/Wk ...	Prepare Final Traffic Tech Report - AF5011/6029	50d	09-23-09	12-02-09	91d		TP1950	EN4460
FINANCIAL STRUCTURES			368d	01-14-09	06-22-10	68d			
3.3 Tolling Analysis			203d	02-16-09	12-01-09	161d			
Field Surveys of Purpose & Frequency			105d	02-16-09	07-14-09	259d			
FN1110	5d/Wk ...	Conduct Field Surveys of Purpose & Frequency, etc. & Compile Info	95d	02-16-09	06-29-09	131d		PM1010	FN1120, FN1210
FN1120	5d/Wk ...	Write Field Surveys of Purpose & Frequency Report - AF3001	10d	06-30-09	07-14-09	259d		FN1110	FN3500
Stated Preference Survey			105d	02-16-09	07-14-09	259d			
FN1150	5d/Wk ...	Conduct Stated Preference Survey, etc. & Compile Info	95d	02-16-09	06-29-09	131d		PM1010	FN1160, FN1210
FN1160	5d/Wk ...	Write Stated Preference Survey Report - AF3002	10d	06-30-09	07-14-09	259d		FN1150	FN3500
Revised Tolling Model for Application w/Metro Models			63d	06-30-09	09-28-09	206d			
FN1210	5d/Wk ...	Create Revised Tolling Model for Application w/Metro Models	30d	06-30-09	08-11-09	131d		FN1110, FN1150	FN1220
FN1220	5d/Wk ...	Run Revised Tolling Model	18d	08-12-09	09-04-09	131d		FN1210, FN1260	FN1230, FN1410
FN1230	5d/Wk ...	Write Revised Tolling Memo - AF3003	15d	09-08-09	09-28-09	206d		FN1220	FN3500
Alternative Tolling Rate Structures			40d	05-05-09	06-30-09	160d			
FN1250	5d/Wk ...	Identify Alternative Toll Rate Structures for Tolling Optimization Study	30d	05-05-09	06-16-09	160d		PM1010	FN1260, FN1410
FN1260	5d/Wk ...	Write Alternative Toll Rate Structures Memo - AF3004	10d	06-17-09	06-30-09	160d		FN1250	FN3500, FN1220
Refined Financial Capacity Analysis Assumptions			40d	05-05-09	06-30-09	178d			

Columbia River CROSSING

Actual Work

Remaining Level of Effort ◆ Milestone

Data Date: 09-01-08

Print Date/Time: 05-28-09 12:10

CRC Project Schedule (Baseline w/ current data through 4/22/09)

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
FN1310	5d/Wk ...	Identify Refined Fin Cap Analysis Assumpt's for Toll Op & Fin Cap Study	30d	05-05-09	06-16-09	178d		PM1010	FN1320
FN1320	5d/Wk ...	Write Refined Financial Capacity Analysis Assumption Memo - AF3005	10d	06-17-09	06-30-09	178d		FN1310	FN1410, FN3500
Refined Toll Collect, Back of House & Other O&M Cost Assumptions			40d	05-05-09	06-30-09	178d			
FN1340	5d/Wk ...	Analyze Refined Toll Collect, Back of House & Other O&M Cost Assump's	30d	05-05-09	06-16-09	178d		PM1010	FN1350
FN1350	5d/Wk ...	Write Refined Toll Coll, Bk of House & O&M Cost Memo - AF3006	10d	06-17-09	06-30-09	178d		FN1340	FN1410
Financial Capacity & Toll Rate Structure Optimization			60d	09-08-09	12-01-09	131d			
FN1410	5d/Wk ...	Analyze Financial Capacity & Toll Rate Structure Optimization	45d	09-08-09	11-09-09	131d		FN1350, FN1320, FN1220, FN1250	FN1420, FN1510, FN1520, FN1530
FN1420	5d/Wk ...	Write Fin Cap & Toll Rate Structure Optimization Report - AF3007	15d	11-10-09	12-01-09	131d		FN1410	FN3500, FN1540
3.4 Refined Analyses of Financial Plan Issues			250d	06-30-09	06-22-10	68d			
FN1500	5d/Wk ...	Write Financial Plan for FEIS - AF3022	65d	06-30-09	09-30-09	5d		PM1140, TP1120, TP1320, TR1080, TR1920, TR1910	EN4100
FN1510	5d/Wk ...	Write Refined Cash-Flow Financial Plan Memo - AF3008	30d	11-10-09	12-22-09	131d		FN1410	FN1550
FN1520	5d/Wk ...	Write Memo Funding Risk Analysis - AF3009	30d	11-10-09	12-22-09	131d		FN1410	FN1550
FN1530	5d/Wk ...	Write Memo Funding Demand Sched per Proj Dev Sched Opt's - AF3010	30d	11-10-09	12-22-09	131d		FN1410	FN1550
FN1540	5d/Wk ...	Write State Funding Document - AF3012	30d	12-02-09	01-14-10	131d		FN1420	FN3500
FN1550	5d/Wk ...	Write Memor to CRC EMG to Support Policy Decision - AF3011	15d	12-23-09	01-14-10	131d		FN1510, FN1520, FN1530	FN3500
FN1570	5d/Wk ...	Prep & Submit New Starts PE & Final Design Material - AF3016	30d	05-11-10	06-22-10	68d		TR0840, EN4500	TR5000
3.5 Institutional, Intergovernmental & Admini/Regulatory/Statutory...			342d	01-14-09	05-14-10	45d			
Intergovernmental Agreements			342d	01-14-09	05-14-10	45d			
Preliminary			56d	01-14-09	04-01-09	0d			
IA2010	5d/Wk ...	Preliminary Draft of Major Agreements	13d	01-14-09	01-30-09	0d		PM1010	IA2020, IA2030
IA2020	5d/Wk ...	Identification of Major Legal Issues Requiring Legal Research	43d	01-14-09	03-13-09	10d		IA2010	IA2100
IA2030	5d/Wk ...	Identification of Major "Negotiating Issues"	43d	01-14-09	03-13-09	0d		IA2010	IA2110, IA2050, IA2060, IA2070, IA2080
IA2050	5d/Wk ...	Revise Outline of Project Development Agreement (ODOT & WSDOT)	13d	03-16-09	04-01-09	0d		IA2030	IA2140
IA2060	5d/Wk ...	Revise Outline of Major Transfer Agreement	13d	03-16-09	04-01-09	0d		IA2030	IA2130
IA2070	5d/Wk ...	Revise Outline of Transit Agency Agreement (C-Tran & TriMet)	13d	03-16-09	04-01-09	0d		IA2030	IA2120
IA2080	5d/Wk ...	Revise Outline of Bridge/Highway Operations Agreement (ODOT & WSDOT)	13d	03-16-09	04-01-09	0d		IA2030	IA2150
Round 1			65d	03-16-09	06-15-09	0d			
IA2100	5d/Wk ...	Legal Research on Issues Identified - Round 1	55d	03-16-09	06-01-09	10d		IA2020	IA2160
IA2110	5d/Wk ...	Negotiations of Issues Identified - Round 1	55d	03-16-09	06-01-09	10d		IA2030	IA2160
IA2120	5d/Wk ...	Prepare Draft of Transit Agency Agreement - Round 1	52d	04-02-09	06-15-09	0d		IA2070	IA2160
IA2130	5d/Wk ...	Prepare Draft of Major Transfer Agreement - Round 1	52d	04-02-09	06-15-09	0d		IA2060	IA2160
IA2140	5d/Wk ...	Prepare Draft of Project Development Agreement - Round 1	52d	04-02-09	06-15-09	0d		IA2050	IA2160
IA2150	5d/Wk ...	Prepare Draft of Bridge/Highway Operations Agreement - Round 1	52d	04-02-09	06-15-09	0d		IA2080	IA2160
IA2160	5d/Wk ...	Internal Agreement Preparation Complete (Round 1)	0d		06-15-09*	0d	06-15-09	IA2120, IA2130, IA2140, IA2150, IA2100, IA2110	IA2200, IA2210
Round 2			43d	06-16-09	08-14-09	45d			
IA2200	5d/Wk ...	Legal Research on Issues Identified - Round 2	21d	06-16-09	07-15-09	45d		IA2160	IA2300
IA2210	5d/Wk ...	Negotiations of Issues Identified - Round 2	21d	06-16-09	07-15-09	45d		IA2160	IA2220, IA2230, IA2240, IA2250
IA2220	5d/Wk ...	Prepare Draft of Transit Agency Agreement - Round 2	22d	07-16-09	08-14-09	45d		IA2210	IA2320, IA2310
IA2230	5d/Wk ...	Prepare Draft of Major Transfer Agreement - Round 2	22d	07-16-09	08-14-09	45d		IA2210	IA2320, IA2310
IA2240	5d/Wk ...	Prepare Draft of Project Development Agreement - Round 2	22d	07-16-09	08-14-09	45d		IA2210	IA2320, IA2310
IA2250	5d/Wk ...	Prepare Draft of Bridge/Highway Operations Agreement - Round 2	22d	07-16-09	08-14-09	45d		IA2210	IA2320, IA2310
Round 3			75d	07-16-09	10-29-09	45d			
IA2300	5d/Wk ...	Legal Research on Issues Identified - Round 3	22d	07-16-09	08-14-09	45d		IA2200	IA2320
IA2310	5d/Wk ...	Negotiations of Issues Identified - Round 3	22d	08-17-09	09-16-09	45d		IA2220, IA2230, IA2240, IA2250	IA2330, IA2340, IA2350, IA2360, IA2400
IA2320	5d/Wk ...	First External Legal Reviews - Round 3	22d	08-17-09	09-16-09	45d		IA2220, IA2230, IA2240, IA2250, IA2300	IA2330, IA2340, IA2350, IA2360, IA2400
IA2330	5d/Wk ...	Prepare Draft of Transit Agency Agreement - Round 3	31d	09-17-09	10-29-09	45d		IA2310, IA2320	IA2410, IA2420
IA2340	5d/Wk ...	Prepare Draft of Major Transfer Agreement - Round 3	31d	09-17-09	10-29-09	45d		IA2310, IA2320	IA2410, IA2420
IA2350	5d/Wk ...	Prepare Draft of Project Development Agreement - Round 3	31d	09-17-09	10-29-09	45d		IA2310, IA2320	IA2410, IA2420
IA2360	5d/Wk ...	Prepare Draft of Bridge/Highway Operations Agreement - Round 3	31d	09-17-09	10-29-09	45d		IA2310, IA2320	IA2410, IA2420
Round 4			94d	09-17-09	01-29-10	45d			
IA2400	5d/Wk ...	Legal Research on Issues Identified - Round 4	20d	09-17-09	10-14-09	56d		IA2310, IA2320	IA2420
IA2410	5d/Wk ...	Negotiations of Issues Identified - Round 4	21d	10-30-09	11-30-09	45d		IA2330, IA2340, IA2350, IA2360	IA2430, IA2440, IA2450, IA2460
IA2420	5d/Wk ...	Second External Legal Reviews - Round 4	21d	10-30-09	11-30-09	45d		IA2330, IA2340, IA2350, IA2360, IA2400	IA2430, IA2440, IA2450, IA2460
IA2430	5d/Wk ...	Prepare Draft of Transit Agency Agreement - Round 4	42d	12-01-09	01-29-10	45d		IA2410, IA2420	IA2800, IA2810
IA2440	5d/Wk ...	Prepare Draft of Major Transfer Agreement - Round 4	42d	12-01-09	01-29-10	45d		IA2410, IA2420	IA2800, IA2810
IA2450	5d/Wk ...	Prepare Draft of Project Development Agreement - Round 4	42d	12-01-09	01-29-10	45d		IA2410, IA2420	IA2800, IA2810
IA2460	5d/Wk ...	Prepare Draft of Bridge/Highway Operations Agreement - Round 4	42d	12-01-09	01-29-10	45d		IA2410, IA2420	IA2800, IA2810
Final Agreements			75d	02-01-10	05-14-10	45d			
IA2800	5d/Wk ...	Final Round of External Legal Reviews	21d	02-01-10	03-01-10	45d		IA2430, IA2440, IA2450, IA2460	IA2820, IA2830, IA2840, IA2850
IA2810	5d/Wk ...	FTA Review of Agreements	21d	02-01-10	03-01-10	45d		IA2430, IA2440, IA2450, IA2460	IA2820, IA2830, IA2840, IA2850
IA2820	5d/Wk ...	Final Transit Agency Agreement	33d	03-02-10	04-15-10	45d		IA2800, IA2810	IA2860, FN3320
IA2830	5d/Wk ...	Final Major Transfer Agreement	33d	03-02-10	04-15-10	45d		IA2800, IA2810	IA2860
IA2840	5d/Wk ...	Final Project Development Agreement	33d	03-02-10	04-15-10	45d		IA2800, IA2810	IA2860, FN3340
IA2850	5d/Wk ...	Final Bridge/Highway Operations Agreement	33d	03-02-10	04-15-10	45d		IA2800, IA2810	IA2860, FN3330
IA2860	5d/Wk ...	Enactment of Agreements	21d	04-16-10	05-14-10	45d		IA2820, IA2830, IA2840, IA2850	TR5000, EN4900
Deliverables			308d	02-02-09	04-15-10	66d			
FN3300	5d/Wk ...	Memo on Agreement Status betwn Transit for Funding & Ops - AF3023	60d	02-02-09	04-24-09	314d		PM1010	FN3500
FN3310	5d/Wk ...	Memo on Agrmnt Status betwn DOTs on Fund & Bond Resp's - AF3025	90d	02-02-09	06-08-09	284d		PM1010	FN3500
FN3320	5d/Wk ...	Draft Formal Agreements between Transit Operators - AF3024	0d		04-15-10	66d		IA2820	FN3500
FN3330	5d/Wk ...	Draft Agreements between DOTs - AF3026	0d		04-15-10	66d		IA2850	FN3500
FN3340	5d/Wk ...	Draft Agrmnts bet. DOTs, Transit & Cities for Fin & Proj Dev Resp - AF3027	0d		04-15-10	66d		IA2840	FN3500
FN3500	5d/Wk w/H	Financial Structures Task AF Milestone	0d		04-15-10	66d		FN1120, FN1160, FN1230, FN1260, FN1320, FN1420, FN1540, FN3340, FN1550, FN3320, FN3330, FN3300, FN3310	EN4900, TR5050

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
ENVIRONMENTAL			128...	09-02-08	09-09-13	1419d			
Data Needs			228d	09-02-08	07-24-09	28d			
EN0100	5d/Wk ...	Independent review of induced growth	54d	09-02-08	11-14-08	202d		PM1010	EN3800
EN0110	5d/Wk ...	Independent review of greenhouse gas analysis	77d	09-02-08	12-18-08	179d		PM1010	EN3820
EN0120	5d/Wk ...	Transit design pkg 1	0d	11-04-08		171d		TR1500	EN3260, EN3160, EN3180, EN3200, EN3220, EN3100, EN3420, EN3440, E...
EN0130	5d/Wk ...	Hwy design pkg 1	0d	11-17-08		172d		AL1150	EN3260, EN3160, EN3180, EN3200, EN3220, EN3100, EN3420, EN3440, E...
EN0140	5d/Wk ...	Impervious Surface	0d	11-17-08		98d		AL1150	EN3300, EN3220, EN2130
EN0150	5d/Wk ...	Storm water design	0d	11-17-08		80d		SW1060	EN3240, EN3300, EN3220, EN2130, EN1530, SW1070
EN0160	5d/Wk ...	Construction assumptions	0d	11-17-08		141d		AL1150	EN3180, EN3200, EN3300, EN3400, EN1310, EN1530
EN0170	5d/Wk ...	Bridge design pkg 1	0d	11-18-08		56d		ST0240	EN3240, EN3260, EN3160, EN3180, EN3200, EN3280, EN3300, EN2130, E...
EN0180	5d/Wk ...	Geotech	0d	12-26-08		114d		GT0340	EN3320, EN3260, EN3140, EN3300, EN1530
EN0190	5d/Wk ...	ROW and Acquisitions pkg 1	0d	12-30-08		108d		AL1160	EN3120, EN3320, EN3240, EN3140, EN3160, EN3180, EN3200, EN3400, E...
EN0200	5d/Wk ...	ROW and Acquisitions pkg 2	0d	04-17-09		16d		AL1170, TR0240	EN0220
EN0210	5d/Wk ...	Hwy design pkg 2	1d	05-01-09	05-01-09	11d		KD1110, KD1150, KD1160	EN3160, EN3180, EN3200, EN3280, EN3440, EN1310, EN1210, EN1120, E...
EN0220	5d/Wk ...	WSDOT/ODOT HQ Review of ROW and Acquisitions pkg 2	5d	05-01-09	05-07-09	16d		EN0200	EN3120, EN2810, EN1120
EN0230	5d/Wk ...	Cost Estimates	0d	05-04-09		75d		PM1140	EN3400, EN3480, EN3600
EN0240	5d/Wk ...	Transit modeling pkg 1 (Transit FEIS Modeling)	0d	05-20-09		28d		TR1090	EN3400, EN3420, EN3640, EN3600, EN3620, EN3700, EN0250
EN0250	5d/Wk ...	Transit modeling pkg 2 (2008 Tolling Sensitivity Verification)	1d	05-20-09	05-20-09	52d		EN0240, TR1270	EN3400, EN3420, EN3640, EN3600, EN3620, EN3700
EN0260	5d/Wk ...	Bridge design pkg 2	1d	05-22-09	05-22-09	6d		EN0170, ST0560	EN3160, EN3200, EN3280, EN3440, EN2180, EN1720, EN3240, EN3260, E...
EN0270	5d/Wk ...	Transit design pkg 2	1d	05-27-09	05-27-09	3d		TR1730	EN3160, EN3180, EN3200, EN3280, EN3440, EN3700, EN1310, EN1210, E...
EN0280	5d/Wk ...	VISSIM traffic modeling pkg 1	0d	06-23-09		5d		TR1360, TP1140	EN3400, EN3420, EN3440, EN3460, EN3640, EN3600, EN3620, EN0300
EN0290	5d/Wk ...	Visual simulations	0d	06-26-09		17d		AL1150, RD1110, TR0540	EN3160, EN3180, EN3200, EN3280, EN3440, EN1310
EN0300	5d/Wk ...	VISSIM traffic modeling pkg 2	1d	07-10-09	07-10-09	17d		EN0280, TP1160	EN3400, EN3420, EN3440, EN3460, EN3640, EN3600, EN3620
EN0310	5d/Wk ...	Metro air quality modeling	0d	07-24-09		8d		TR1400	EN3440, EN3640
Tribal Coordination			480d	09-02-08	07-20-10	0d			
EN0500	5d/Wk ...	Treaty Coordination	480d	09-02-08	07-20-10	0d		PM1010	EN4900
EN0800	5d/Wk ...	Tribal Summit 2009	1d	11-03-09	11-03-09	180d		PM1010	EN4900
EN0840	5d/Wk ...	Tribal Summit 2010	1d	06-22-10	06-22-10	19d		PM1010	EN4900
Section 106 - Cultural & Archaeological Resources Permitting			826d	09-02-08	11-28-11	1873d			
Historic Resources DOE(Determinations of Eligiblity) & FOE(Findings of Effect)			214d	09-02-08	07-05-09	28d			
EN1100	5d/Wk ...	DOE - Submit Draft 106 DOEs to DAHP & SHPO (Aug08 A)	0d	09-02-08		76d		PM1010	EN1110
EN1110	5d/Wk ...	DOE Concur - DAHP & SHPO Review & Concur on DOEs	120d	09-02-08	02-19-09	76d		EN1100	EN1120
EN1120	5d/Wk ...	FOE - Prepare & Submit Draft 106 FOEs to DAHP & SHPO	20d	05-08-09	06-05-09	21d		EN1110, EN0210, EN0270, EN0170, EN0220	EN2820, EN1150
EN1150	7d/Wk	FOE Concur - DAHP & SHPO Rev&Concur on FOEs & No Adverse Effect Fin...	30d	06-06-09	07-05-09	38d		EN1120	EN2860, EN1310, EN3160
Archaeology			826d	09-02-08	11-28-11	1873d			
Sub Area Testing - Academy			78d	11-03-08	02-23-09	165d			
AR1010	5d/Wk ...	W-17 Sub Area Work Plan Development	5d	11-03-08	11-07-08	186d		AR1100	AR1015
AR1015	5d/Wk ...	Internal CRC Review	9d	11-10-08	11-20-08	186d		AR1010	AR1020
AR1020	5d/Wk ...	Reconcile Comments and Submit	3d	11-21-08	11-25-08	186d		AR1015	AR1025, AR1030
AR1025	5d/Wk ...	DAHP Review	11d	11-26-08	12-11-08	186d		AR1020	AR1030
AR1030	5d/Wk ...	Tribal Review	7d	12-03-08	12-11-08	186d		AR1025, AR1020	AR1035
AR1035	5d/Wk ...	Reconcile Comments	5d	12-12-08	12-18-08	186d		AR1030	AR1040
AR1040	5d/Wk ...	Submit W-17 Sub Area Work Plan	0d		12-18-08	186d		AR1035	AR1045
AR1045	5d/Wk ...	DAHP Review	2d	12-19-08	12-22-08	186d		AR1040	AR1050
AR1050	5d/Wk ...	Site Visit with DAHP to Discuss Comments	1d	12-30-08	12-30-08	186d		AR1045	AR1055
AR1055	5d/Wk ...	Finalize Work Plan and Re-submit	7d	12-31-08	01-09-09	186d		AR1050	AR1060
AR1060	5d/Wk ...	Tribal Review to Concur with DAHPs Comments	6d	01-02-09	01-09-09	186d		AR1055	AR1065
AR1065	5d/Wk ...	Archeological Field Operations	10d	02-10-09	02-23-09	165d		AR1060, AR1110, AR1130	AR1300, AR1400
Phase I - Survey			211d	09-02-08	06-29-09	30d			
AR1100	5d/Wk ...	Heritage Research Assoc (HRA) Gr Penet Radar (GPR) WA Work Compl	44d	09-02-08	10-31-08	5d		PM1010	AR1160, AR1180, AR1120, AR1010
AR1110	5d/Wk ...	Inadvertant Discovery Plan (IDP)	100d	09-02-08	01-22-09	0d		PM1010	AR1065, AR1150
AR1120	5d/Wk ...	Survey & Testing Approval Period	49d	11-03-08	01-13-09	5d		AR1100	AR1130
AR1130	5d/Wk ...	DAHP Survey & Testing Decision Workshop	2d	01-14-09	01-15-09	5d		AR1120	AR1140, AR1065, AR1150
AR1140	5d/Wk ...	GPR / Magnetometry on National Parks Service (NPS) Preparation	41d	01-16-09	03-13-09	41d		AR1130	AR1160
Sub-Surface Survey			106d	01-23-09	06-22-09	35d			
AR1150	5d/Wk ...	Archaeology Contract Preparation	36d	01-23-09	03-13-09	0d		AR1110, AR1130	AR1160, AR1180, AR1170
AR1160	5d/Wk ...	East Side I-5 Washington Survey	40d	03-16-09	05-08-09	0d		AR1100, AR1140, AR1150	AR1260, AR1200, AR1170, AR1180
AR1170	5d/Wk ...	Oregon Survey	20d	05-11-09	06-08-09	45d		AR1150, AR1160	AR1250
AR1180	5d/Wk ...	West Side I-5 Washington Survey	30d	05-11-09	06-22-09	0d		AR1100, AR1150, AR1160	AR1270, AR1200
Research Design			27d	05-21-09	06-29-09	0d			
AR1200	5d/Wk ...	Arch Testing Research Design Development - AF6035	27d	05-21-09	06-29-09	0d		AR1160, AR1180	AR1270, AR1260
Phase II - Testing / Evaluation			122d	06-09-09	11-30-09	25d			
AR1250	5d/Wk ...	Oregon Testing	20d	06-09-09	07-07-09	45d		AR1170	EN3320, AR1300, EN1310, AR1400
AR1260	5d/Wk ...	East Side I-5 Washington Testing	60d	06-16-09	09-09-09	0d		AR1160, AR1200	EN3320, AR1300, EN1310, AR1400
AR1270	5d/Wk ...	West Side I-5 Washington Testing	40d	06-23-09	08-18-09	15d		AR1180, AR1200	EN3320, AR1300, EN1310, AR1400
Cultural Resources Report & Project FOE			76d	08-13-09	11-30-09	25d			
AR1300	5d/Wk ...	Cultural Resources Report Development	40d	08-13-09	10-08-09	26d		AR1250, AR1270, AR1260, AR1065, EN3320	AR1500
AR1400	5d/Wk ...	Project FOE Development	40d	08-13-09	10-08-09	26d		AR1250, AR1270, AR1260, AR1065	AR1500
AR1500	7d/Wk	DAHP, SHPO & Tribal Review of Project FOE & CR Report	30d	10-09-09	11-07-09	37d		AR1300, AR1400	AR1600
AR1600	5d/Wk ...	Revise the Project FOE	15d	11-09-09	11-30-09	25d		AR1500	AR1700
AR1700	5d/Wk ...	Project FOE Concurrence Complete - AF6011	0d		11-30-09	25d		AR1600, EN3320	EN1310
Phase III - Data Recovery / Mitigation			420d	04-06-10	11-28-11	1873d			
AR1800	5d/Wk ...	Data Recovery incl Curation	128d	04-06-10	10-05-10	1873d		EN1430	AR2100
AR2100	5d/Wk ...	106 Mitigation Implementation	400d	05-04-10	11-28-11	1873d		AR1800	CN1030
Refined APE (Area of Potential Effects)			50d	05-28-09	08-06-09	93d			
EN1210	5d/Wk ...	1st draft refined APE	10d	05-28-09	06-10-09	93d		EN0210, EN0270, EN0190	EN1220
EN1220	5d/Wk ...	CRC/DOT review refined APE	10d	06-11-09	06-24-09	93d		EN1210	EN1230
EN1230	5d/Wk ...	2nd draft refined APE	10d	06-25-09	07-09-09	93d		EN1220	EN1240
EN1240	5d/Wk ...	FTA/FHWA/SHPO/DAHP/Tribes review refined APE	20d	07-10-09	08-06-09	93d		EN1230	EN1250
EN1250	5d/Wk ...	Approved final APE - AF6009	0d		08-06-09	93d		EN1240	EN1310, EN4220

Columbia River CROSSING

Actual Work

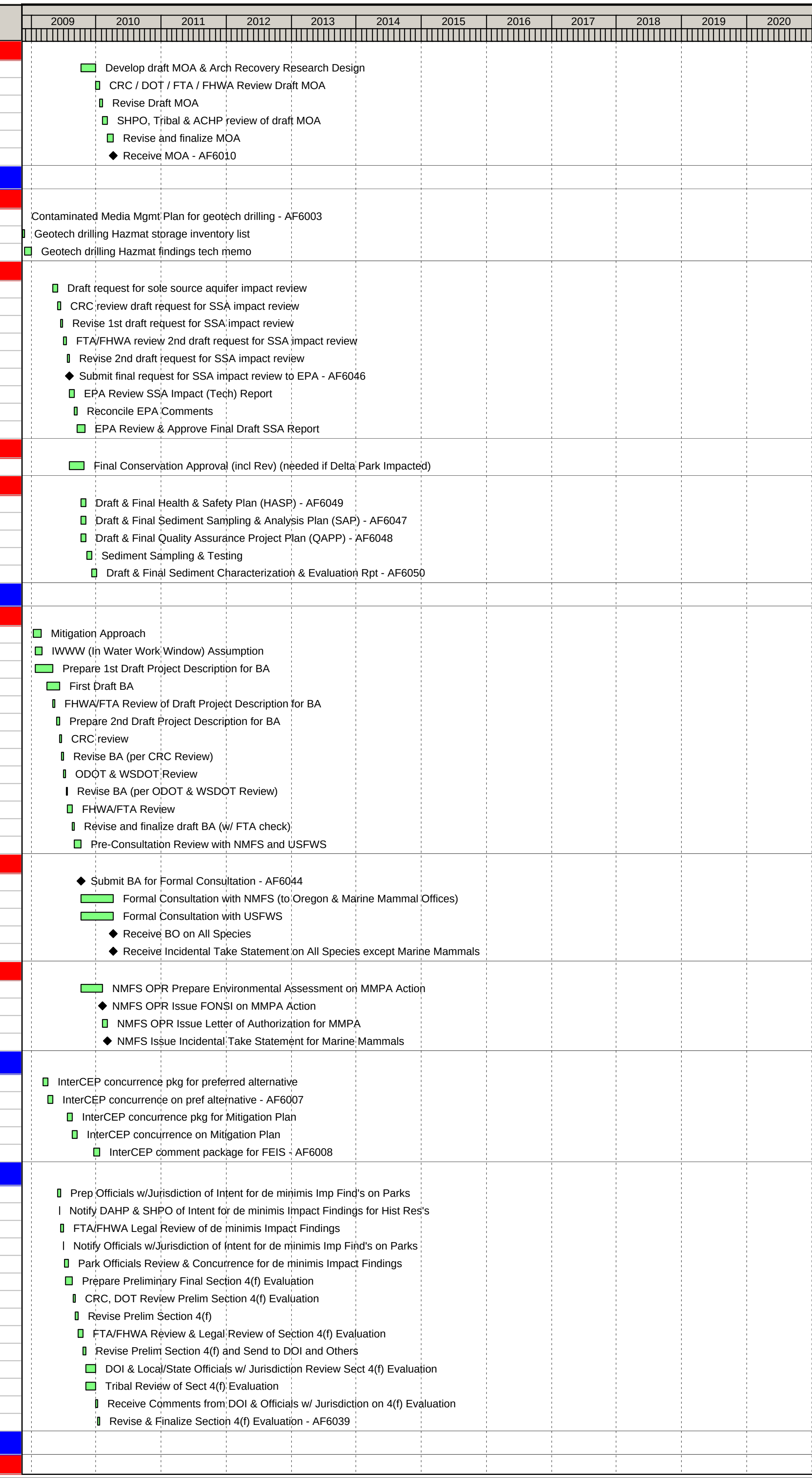
Remaining Level of Effort ◆ ◆ Milestone

Data Date: 09-01-08

Print Date/Time: 05-28-09 12:10

CRC Project Schedule (Baseline w/ current data through 4/22/09)

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
Memorandum of Agreement			127d	10-06-09	04-05-10	25d			
EN1310	5d/Wk ...	Develop draft MOA & Arch Recovery Research Design	60d	10-06-09	12-30-09	25d		EN0130, EN0210, EN0170, EN0290, EN0120, EN0270, EN0160, EN1250, E...	EN1340
EN1340	5d/Wk ...	CRC / DOT / FTA / FHWA Review Draft MOA	15d	12-31-09	01-21-10	25d		EN1310	EN1400
EN1400	5d/Wk ...	Revise Draft MOA	10d	01-22-10	02-04-10	25d		EN1340	EN1410
EN1410	5d/Wk ...	SHPO, Tribal & ACHP review of draft MOA	21d	02-05-10	03-05-10	25d		EN1400	EN1420
EN1420	5d/Wk ...	Revise and finalize MOA	21d	03-08-10	04-05-10	25d		EN1410	EN1430
EN1430	5d/Wk ...	Receive MOA - AF6010	0d		04-05-10	25d		EN1420	EN4600, AR1800
Other Pre-ROD Permitting Support			302d	10-29-08	01-06-10	137d			
Hazmat support to Geotech Drilling			45d	10-29-08	01-02-09	170d			
EN1500	5d/Wk ...	Contaminated Media Mgmt Plan for geotech drilling - AF6003	10d	10-29-08	11-11-08	4d		PM1010	GT0330, EN1510
EN1510	5d/Wk ...	Geotech drilling Hazmat storage inventory list	10d	11-12-08	11-25-08	170d		EN1500	EN3140, EN1520
EN1520	5d/Wk ...	Geotech drilling Hazmat findings tech memo	25d	11-26-08	01-02-09	170d		EN1510	EN3140
Sole Source Aquifer Impact Review (TECH REPORT)			126d	05-04-09	10-29-09	114d			
EN1530	5d/Wk ...	Draft request for sole source aquifer impact review	20d	05-04-09	06-01-09	24d		EN0150, EN0160, EN0180, EN0210	EN1540
EN1540	5d/Wk ...	CRC review draft request for SSA impact review	10d	06-02-09	06-15-09	24d		EN1530	EN1550
EN1550	5d/Wk ...	Revise 1st draft request for SSA impact review	10d	06-16-09	06-29-09	24d		EN1540, ST0410	EN1560
EN1560	5d/Wk ...	FTA/FHWA review 2nd draft request for SSA impact review	15d	06-30-09	07-21-09	24d		EN1550	EN1570
EN1570	5d/Wk ...	Revise 2nd draft request for SSA impact review	10d	07-22-09	08-04-09	24d		EN1560	EN1600
EN1600	5d/Wk ...	Submit final request for SSA impact review to EPA - AF6046	0d		08-04-09	24d		EN1570	EN1610
EN1610	5d/Wk ...	EPA Review SSA Impact (Tech) Report	21d	08-05-09	09-02-09	24d		EN1600	EN4100, EN1620
EN1620	5d/Wk ...	Reconcile EPA Comments	10d	09-03-09	09-17-09	114d		EN1610	EN1630
EN1630	5d/Wk ...	EPA Review & Approve Final Draft SSA Report	30d	09-18-09	10-29-09	114d		EN1620	EN4500
Section 6(f)			60d	08-04-09	10-27-09	175d			
EN1650	5d/Wk ...	Final Conservation Approval (incl Rev) (needed if Delta Park Impacted)	60d	08-04-09	10-27-09	175d		EN3180	EN4900
Sediment Sampling and Analysis			61d	10-09-09	01-06-10	137d			
EN1710	5d/Wk ...	Draft & Final Health & Safety Plan (HASP) - AF6049	21d	10-09-09	11-06-09	57d		EN0260, EN2250	EN1740
EN1720	5d/Wk ...	Draft & Final Sediment Sampling & Analysis Plan (SAP) - AF6047	21d	10-09-09	11-06-09	57d		EN0170, EN0260, EN2250	EN1740
EN1730	5d/Wk ...	Draft & Final Quality Assurance Project Plan (QAPP) - AF6048	21d	10-09-09	11-06-09	57d		EN0260, EN2250	EN1740
EN1740	IW4m 5...	Sediment Sampling & Testing	20d	11-09-09	12-07-09	57d		EN1710, EN1720, EN1730	EN1750
EN1750	5d/Wk ...	Draft & Final Sediment Characterization & Evaluation Rpt - AF6050	20d	12-08-09	01-06-10	137d		EN1740	EN4900
Biological Assessment/Opinion (for ESA Sect 7 Consultation)			313d	01-15-09	04-06-10	54d			
BA Preparation			188d	01-15-09	10-08-09	14d			
EN2100	5d/Wk ...	Mitigation Approach	30d	01-15-09	02-25-09	68d		ST0250	EN2130
EN2110	5d/Wk ...	IWWW (In Water Work Window) Assumption	30d	01-23-09	03-05-09	62d		ST0250	EN2130
EN2120	5d/Wk ...	Prepare 1st Draft Project Description for BA	71d	01-23-09	05-01-09	11d		EN0170, EN0210	EN2180, EN2170
EN2130	5d/Wk ...	First Draft BA	50d	03-31-09	06-09-09	5d		EN0140, EN0170, EN0150, EN2110, EN2100, ST0250, EN2180, ST0510	EN2190
EN2170	5d/Wk ...	FHWA/FTA Review of Draft Project Description for BA	10d	05-04-09	05-15-09	11d		EN2120	EN2180
EN2180	5d/Wk ...	Prepare 2nd Draft Project Description for BA	10d	05-26-09	06-08-09	6d		EN0210, EN2120, EN2170, EN0260	EN2130
EN2190	5d/Wk ...	CRC review	10d	06-10-09	06-23-09	5d		EN2130	EN2200
EN2200	5d/Wk ...	Revise BA (per CRC Review)	5d	06-24-09	06-30-09	5d		EN2190	EN2210
EN2210	5d/Wk ...	ODOT & WSDOT Review	10d	07-01-09	07-15-09	5d		EN2200	EN2220
EN2220	5d/Wk ...	Revise BA (per ODOT & WSDOT Review)	5d	07-16-09	07-22-09	5d		EN2210	EN2230, EN2630
EN2230	5d/Wk ...	FHWA/FTA Review	20d	07-23-09	08-19-09	14d		EN2220	EN2240
EN2240	5d/Wk ...	Revise and finalize draft BA (w/ FTA check)	10d	08-20-09	09-02-09	14d		EN2230	EN2250
EN2250	5d/Wk ...	Pre-Consultation Review with NMFS and USFWS	25d	09-03-09	10-08-09	14d		EN2240	EN2290, EN1730, EN1710, EN1720, EN2530
NMFS and USFWS Consultation (Endangered Species Act)			125d	10-08-09	04-06-10	14d			
EN2290	5d/Wk ...	Submit BA for Formal Consultation - AF6044	0d		10-08-09	14d		EN2250	EN2300, EN2400
EN2300	7d/Wk	Formal Consultation with NMFS (to Oregon & Marine Mammal Offices)	180d	10-09-09	04-06-10	20d		EN2290	EN2500, EN2510
EN2400	7d/Wk	Formal Consultation with USFWS	180d	10-09-09	04-06-10	20d		EN2290	EN2500, EN2510
EN2500	5d/Wk ...	Receive BO on All Species	0d		04-06-10	14d		EN2300, EN2400, ST0260	EN4600, EN4480
EN2510	5d/Wk ...	Receive Incidental Take Statement on All Species except Marine Mammals	0d		04-06-10	14d		EN2300, EN2400	EN4480, EN4600
Marine Mammal Protection Act (MMPA) Consultation			103d	10-09-09	03-05-10	76d			
EN2530	7d/Wk	NMFS OPR Prepare Environmental Assessment on MMPA Action	120d	10-09-09	02-05-10	108d		EN2250	EN2535
EN2535	5d/Wk ...	NMFS OPR Issue FONSI on MMPA Action	0d		02-05-10	76d		EN2530	EN2540
EN2540	5d/Wk ...	NMFS OPR Issue Letter of Authorization for MMPA	20d	02-08-10	03-05-10	76d		EN2535	EN2545
EN2545	5d/Wk ...	NMFS Issue Incidental Take Statement for Marine Mammals	0d		03-05-10	76d		EN2540	EN4730
InterCEP Concurrence and Comment for FEIS			220d	03-09-09	01-18-10	70d			
EN2610	5d/Wk ...	InterCEP concurrence pkg for preferred alternative	20d	03-09-09	04-03-09	61d		KD1110	EN2620
EN2620	5d/Wk ...	InterCEP concurrence on pref alternative - AF6007	20d	04-06-09	05-01-09	61d		EN2610	EN4100, EN2630
EN2630	5d/Wk ...	InterCEP concurrence pkg for Mitigation Plan	20d	07-23-09	08-19-09	5d		EN2620, EN2220	EN2640
EN2640	5d/Wk ...	InterCEP concurrence on Mitigation Plan	20d	08-20-09	09-17-09	5d		EN2630	EN4100
EN2680	5d/Wk ...	InterCEP comment package for FEIS - AF6008	20d	12-18-09	01-18-10	70d		EN4210	EN4480
Section 4(f) - Final Evaluation			166d	05-28-09	01-21-10	2d			
EN2810	5d/Wk ...	Prep Officials w/Jurisdiction of Intent for de minimis Imp Find's on Parks	15d	05-28-09	06-17-09	3d		EN0210, EN0170, EN0270, EN0220	EN2830
EN2820	5d/Wk ...	Notify DAHP & SHPO of Intent for de minimis Impact Findings for Hist Res's	1d	06-08-09	06-08-09	21d		EN1120	EN2850
EN2830	5d/Wk ...	FTA/FHWA Legal Review of de minimis Impact Findings	10d	06-18-09	07-01-09	3d		EN2810	EN2840
EN2840	5d/Wk ...	Notify Officials w/Jurisdiction of Intent for de minimis Imp Find's on Parks	1d	07-02-09	07-02-09	3d		EN2830	EN2850
EN2850	5d/Wk ...	Park Officials Review & Concurrence for de minimis Impact Findings	20d	07-06-09	07-31-09	3d		EN2820, EN2840	EN2860
EN2860	5d/Wk ...	Prepare Preliminary Final Section 4(f) Evaluation	30d	07-13-09	08-21-09	3d		EN2850, EN1150	EN2870
EN2870	5d/Wk ...	CRC, DOT Review Prelim Section 4(f) Evaluation	10d	08-24-09	09-04-09	3d		EN2860	EN2880
EN2880	5d/Wk ...	Revise Prelim Section 4(f)	10d	09-08-09	09-21-09	3d		EN2870	EN2890
EN2890	5d/Wk ...	FTA/FHWA Review & Legal Review of Section 4(f) Evaluation	21d	09-22-09	10-20-09	3d		EN2880	EN2900
EN2900	5d/Wk ...	Revise Prelim Section 4(f) and Send to DOI and Others	12d	10-21-09	11-05-09	3d		EN2890	EN2910, EN2920
EN2910	7d/Wk	DOI & Local/State Officials w/ Jurisdiction Review Sect 4(f) Evaluation	55d	11-06-09	12-30-09	5d		EN2900	EN2930
EN2920	7d/Wk	Tribal Review of Sect 4(f) Evaluation	55d	11-06-09	12-30-09	5d		EN2900	EN2930
EN2930	5d/Wk ...	Receive Comments from DOI & Officials w/ Jurisdiction on 4(f) Evaluation	5d	12-31-09	01-07-10	2d		EN2910, EN2920	EN2970
EN2970	5d/Wk ...	Revise & Finalize Section 4(f) Evaluation - AF6039	10d	01-08-10	01-21-10	2d		EN2930	EN4240
Technical Reports			130d	05-04-09	11-04-09	20d			
Group A			110d	05-04-09	10-07-09	40d			



Columbia River CROSSING

Actual Work

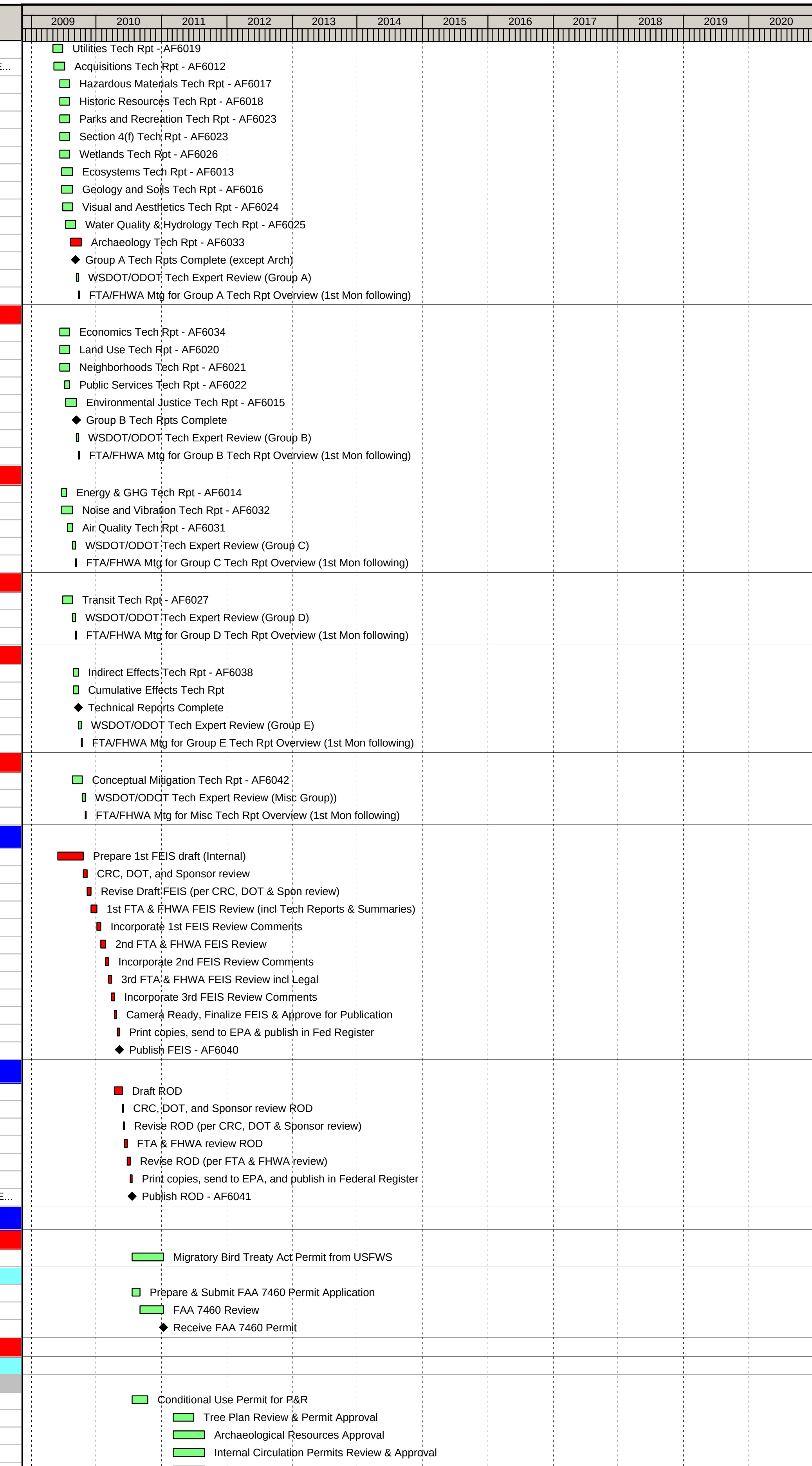
Remaining Level of Effort ◆ Milestone

Data Date: 09-01-08

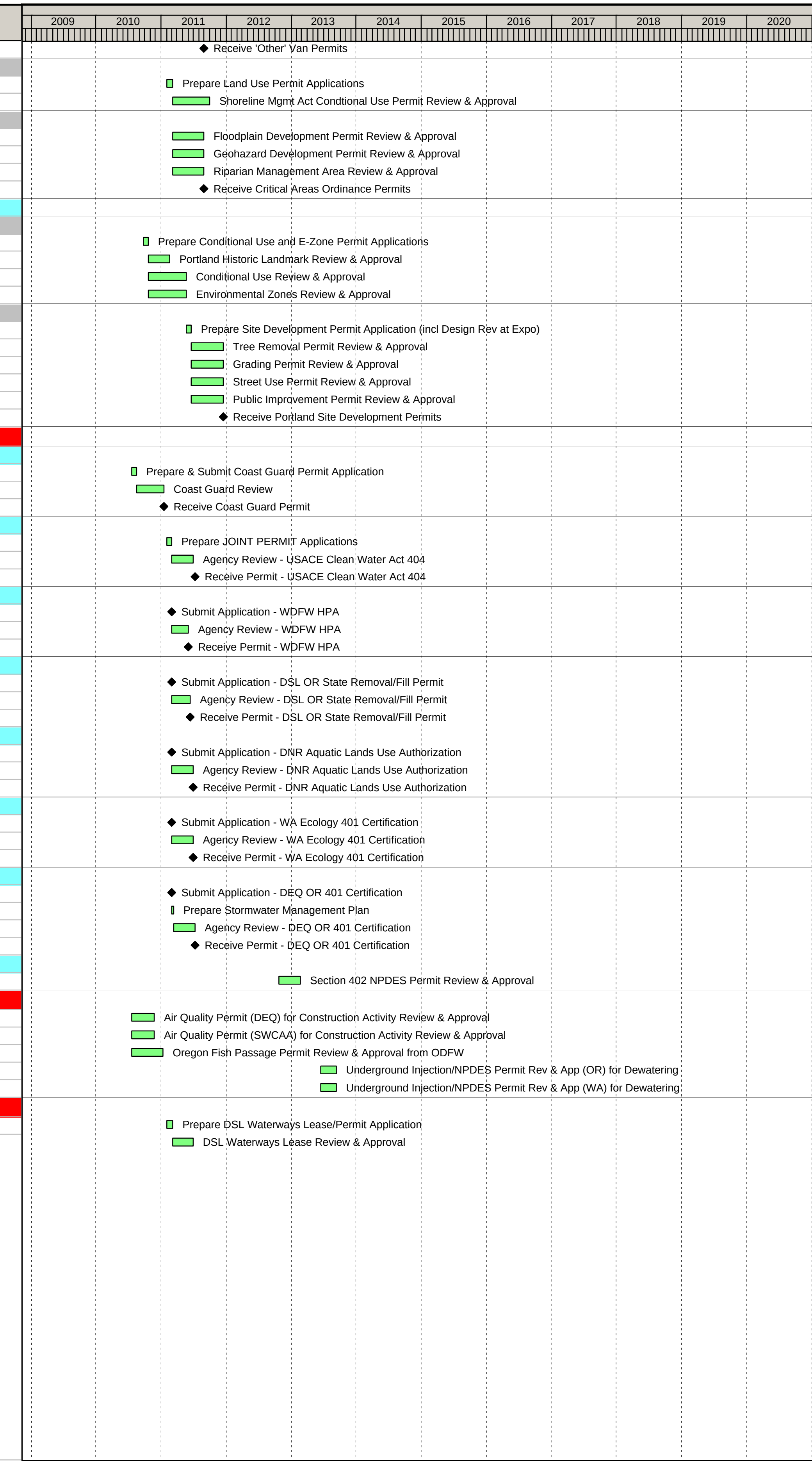
Print Date/Time: 05-28-09 12:10

CRC Project Schedule (Baseline w/ current data through 4/22/09)

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
EN3100	5d/Wk ...	Utilities Tech Rpt - AF6019	40d	05-04-09	06-29-09	55d		EN0130, EN0120, EN0210	EN3340
EN3120	5d/Wk ...	Acquisitions Tech Rpt - AF6012	40d	05-08-09	07-06-09	16d		EN0190, EN0220	EN3900, EN3340, EN3400, EN3180, EN3280, EN3140, EN3160, EN3200, E...
EN3140	5d/Wk ...	Hazardous Materials Tech Rpt - AF6017	40d	06-08-09	08-03-09	31d		EN0190, EN0180, EN1510, EN1520, EN3120	EN3340, EN3900
EN3160	5d/Wk ...	Historic Resources Tech Rpt - AF6018	40d	06-08-09	08-03-09	31d		EN0130, EN0190, EN0210, EN0170, EN0290, EN0120, EN0270, EN1150, E...	EN3340
EN3180	5d/Wk ...	Parks and Recreation Tech Rpt - AF6023	40d	06-08-09	08-03-09	31d		EN0130, EN0210, EN0170, EN0290, EN0120, EN0270, EN0160, EN0190, E...	EN3340, EN1650
EN3200	5d/Wk ...	Section 4(f) Tech Rpt - AF6023	40d	06-08-09	08-03-09	31d		EN0130, EN0210, EN0170, EN0290, EN0120, EN0270, EN0160, EN0190, E...	EN3340, EN3900
EN3220	5d/Wk ...	Wetlands Tech Rpt - AF6026	40d	06-08-09	08-03-09	31d		EN0130, EN0140, EN0150, EN0120, EN3120	EN3340, EN3900
EN3240	5d/Wk ...	Ecosystems Tech Rpt - AF6013	40d	06-23-09	08-18-09	20d		EN0190, EN0170, EN0150, EN0260	EN3340, EN3900
EN3260	5d/Wk ...	Geology and Soils Tech Rpt - AF6016	40d	06-23-09	08-18-09	20d		EN0170, EN0180, EN0130, EN0120, EN0260	EN3340
EN3280	5d/Wk ...	Visual and Aesthetics Tech Rpt - AF6024	40d	06-26-09	08-21-09	17d		EN0210, EN0170, EN0290, EN0270, EN0260, EN3120	EN3340
EN3300	5d/Wk ...	Water Quality & Hydrology Tech Rpt - AF6025	40d	07-14-09	09-08-09	6d		EN0140, EN0180, EN0170, EN0150, EN0160, SW1160	EN3340, EN3900
EN3320	5d/Wk ...	Archaeology Tech Rpt - AF6033	40d	08-12-09	10-07-09	0d		EN0190, EN0180, AR1250, AR1270, AR1260	AR1700, AR1300, EN4100
EN3340	5d/Wk ...	Group A Tech Rpts Complete (except Arch)	0d		09-08-09	6d		EN3240, EN3260, EN3140, EN3160, EN3180, EN3200, EN3280, EN3300, E...	EN3800, EN3820, EN3350, RD1140
EN3350	5d/Wk ...	WSDOT/ODOT Tech Expert Review (Group A)	10d	09-09-09	09-22-09	46d		EN3340	EN3360
EN3360	5d/Wk ...	FTA/FHWA Mtg for Group A Tech Rpt Overview (1st Mon following)	5d	09-23-09	09-29-09	46d		EN3350	EN4220
Group B			81d	06-08-09	09-30-09	45d			
EN3400	5d/Wk ...	Economics Tech Rpt - AF6034	40d	06-08-09	08-03-09	31d		EN0230, EN0190, EN0280, EN0240, EN0160, EN0250, EN0300, EN3120	EN3500
EN3420	5d/Wk ...	Land Use Tech Rpt - AF6020	40d	06-08-09	08-03-09	31d		EN0130, EN0120, EN0190, EN0280, EN0240, EN0250, EN0300, EN3120	EN3500
EN3440	5d/Wk ...	Neighborhoods Tech Rpt - AF6021	40d	06-11-09	08-06-09	28d		EN0130, EN0210, EN0290, EN0120, EN0270, EN0190, EN0280, EN0310, E...	EN3500
EN3460	5d/Wk ...	Public Services Tech Rpt - AF6022	20d	07-07-09	08-03-09	31d		EN0130, EN0120, EN0190, EN0280, EN0300, EN3120	EN3500
EN3480	5d/Wk ...	Environmental Justice Tech Rpt - AF6015	40d	07-15-09	09-09-09	5d		EN0230, EN0190, EN3640, EN3620, EN3700	EN3500
EN3500	5d/Wk ...	Group B Tech Rpts Complete	0d		09-09-09	5d		EN3400, EN3480, EN3420, EN3440, EN3460	EN3800, EN3820, EN3510, RD1140
EN3510	5d/Wk ...	WSDOT/ODOT Tech Expert Review (Group B)	10d	09-10-09	09-23-09	45d		EN3500	EN3520
EN3520	5d/Wk ...	FTA/FHWA Mtg for Group B Tech Rpt Overview (1st Mon following)	5d	09-24-09	09-30-09	45d		EN3510	EN4220
Group C			57d	06-23-09	09-11-09	58d			
EN3600	5d/Wk ...	Energy & GHG Tech Rpt - AF6014	20d	06-23-09	07-21-09	55d		EN0230, EN0280, EN0240, EN0250, EN0300	EN4100, EN3650
EN3620	5d/Wk ...	Noise and Vibration Tech Rpt - AF6032	40d	06-23-09	08-18-09	5d		EN0280, EN0240, EN0250, EN0300, EN3120	EN3900, EN3650, EN3480, RD1140
EN3640	5d/Wk ...	Air Quality Tech Rpt - AF6031	20d	07-24-09	08-20-09	8d		EN0280, EN0240, EN0310, EN0250, EN0300	EN3480, EN3650
EN3650	5d/Wk ...	WSDOT/ODOT Tech Expert Review (Group C)	10d	08-21-09	09-03-09	58d		EN3620, EN3600, EN3640	EN3660
EN3660	5d/Wk ...	FTA/FHWA Mtg for Group C Tech Rpt Overview (1st Mon following)	5d	09-04-09	09-11-09	58d		EN3650	EN4220
Group D			55d	06-25-09	09-11-09	58d			
EN3700	5d/Wk ...	Transit Tech Rpt - AF6027	40d	06-25-09	08-20-09	8d		EN0120, EN0270, EN0240, TR1940, EN0250	EN4100, EN3740, EN3480
EN3740	5d/Wk ...	WSDOT/ODOT Tech Expert Review (Group D)	10d	08-21-09	09-03-09	58d		EN3700	EN3750
EN3750	5d/Wk ...	FTA/FHWA Mtg for Group D Tech Rpt Overview (1st Mon following)	5d	09-04-09	09-11-09	58d		EN3740	EN4220
Group E			35d	08-26-09	10-14-09	35d			
EN3800	5d/Wk ...	Indirect Effects Tech Rpt - AF6038	20d	08-26-09	09-23-09	5d		EN0100, EN3340, EN3500	EN3840
EN3820	5d/Wk ...	Cumulative Effects Tech Rpt	20d	08-26-09	09-23-09	5d		EN0110, EN3340, EN3500	EN3840
EN3840	5d/Wk ...	Technical Reports Complete	0d		09-23-09	5d		EN3800, EN3820	EN4100, EN3850
EN3850	5d/Wk ...	WSDOT/ODOT Tech Expert Review (Group E)	10d	09-24-09	10-07-09	35d		EN3840	EN3860
EN3860	5d/Wk ...	FTA/FHWA Mtg for Group E Tech Rpt Overview (1st Mon following)	5d	10-08-09	10-14-09	35d		EN3850	EN4220
Misc			55d	08-19-09	11-04-09	20d			
EN3900	5d/Wk ...	Conceptual Mitigation Tech Rpt - AF6042	40d	08-19-09	10-14-09	5d		EN3620, EN3220, EN3300, EN3200, EN3140, EN3240, EN3120, RD1110, ...	EN4100, EN3940
EN3940	5d/Wk ...	WSDOT/ODOT Tech Expert Review (Misc Group))	10d	10-15-09	10-28-09	20d		EN3900	EN3950
EN3950	5d/Wk ...	FTA/FHWA Mtg for Misc Tech Rpt Overview (1st Mon following)	5d	10-29-09	11-04-09	20d		EN3940	EN4220
FEIS			240d	06-02-09	05-10-10	0d			
EN4100	5d/Wk ...	Prepare 1st FEIS draft (Internal)	100d	06-02-09	10-21-09	0d		EN3840, EN3700, TR1090, EN1610, EN2620, TR1360, TR1070, EN3600, T...	EN4200, TR1460
EN4200	5d/Wk ...	CRC, DOT, and Sponsor review	15d	10-22-09	11-11-09	0d		EN4100	EN4210
EN4210	5d/Wk ...	Revise Draft FEIS (per CRC, DOT & Spon review)	15d	11-12-09	12-03-09	0d		EN4200, TR1460	EN4220, EN2680
EN4220	5d/Wk ...	1st FTA & FHWA FEIS Review (incl Tech Reports & Summaries)	20d	12-04-09	01-04-10	0d		EN4210, TR0180, EN1250, SW1160, EN3360, EN3520, EN3660, EN3750, ...	EN4230
EN4230	5d/Wk ...	Incorporate 1st FEIS Review Comments	15d	01-05-10	01-25-10	0d		EN4220	EN4240
EN4240	5d/Wk ...	2nd FTA & FHWA FEIS Review	20d	01-26-10	02-22-10	0d		EN4230, EN2970	EN4250
EN4250	5d/Wk ...	Incorporate 2nd FEIS Review Comments	10d	02-23-10	03-08-10	0d		EN4240	EN4260
EN4260	5d/Wk ...	3rd FTA & FHWA FEIS Review incl Legal	15d	03-09-10	03-29-10	0d		EN4250	EN4270
EN4270	5d/Wk ...	Incorporate 3rd FEIS Review Comments	10d	03-30-10	04-12-10	0d		EN4260	EN4460
EN4460	5d/Wk ...	Camera Ready, Finalize FEIS & Approve for Publication	10d	04-13-10	04-26-10	0d		EN4270, TP1980, AM1050, CM1400	EN4480
EN4480	5d/Wk ...	Print copies, send to EPA & publish in Fed Register	10d	04-27-10	05-10-10	0d		EN2680, EN4460, EN2500, EN2510	EN4500
EN4500	5d/Wk ...	Publish FEIS - AF6040	0d		05-10-10	0d		EN4480, EN1630	EN4600, UT1550, FN1570
Record of Decision			69d	04-13-10	07-20-10	0d			
EN4600	5d/Wk ...	Draft ROD	30d	04-13-10	05-24-10	0d		EN4500, EN2500, EN1430, AM1050, EN2510	EN4700
EN4700	5d/Wk ...	CRC, DOT, and Sponsor review ROD	5d	05-25-10	06-01-10	0d		EN4600	EN4710
EN4710	5d/Wk ...	Revise ROD (per CRC, DOT & Sponsor review)	5d	06-02-10	06-08-10	0d		EN4700	EN4720
EN4720	5d/Wk ...	FTA & FHWA review ROD	10d	06-09-10	06-22-10	0d		EN4710	EN4730
EN4730	5d/Wk ...	Revise ROD (per FTA & FHWA review)	10d	06-23-10	07-07-10	0d		EN4720, EN2545	EN4880
EN4880	5d/Wk ...	Print copies, send to EPA, and publish in Federal Register	9d	07-08-10	07-20-10	0d		EN4730	EN4900
EN4900	5d/Wk ...	Publish ROD - AF6041	0d		07-20-10*	0d	07-20-10	EN4880, TR0180, FN3500, EN0840, EN0800, TR4880, AM1590, EN1650, E...	UT1600, RW1200, UT1550, DS6100, PM1210, EP3100, DS1400, TR5000, E...
Post-ROD Permitting			800d	07-21-10	09-09-13	277d			
Federal Permits			120d	07-21-10	01-10-11	347d			
EP0100	5d/Wk ...	Migratory Bird Treaty Act Permit from USFWS	120d	07-21-10	01-10-11	347d		EN4900	RB1990, AA1110, AA1410, AA1510, AA1610, AA1710, AA2220, AA2420
FAA 7460 Notice of Proposed Constr or Alteration Permit (Perm Str's)			120d	07-21-10	01-10-11	347d			
EP0200	5d/Wk ...	Prepare & Submit FAA 7460 Permit Application	30d	07-21-10	08-31-10	347d		EN4900, ST0710	EP0220
EP0220	5d/Wk ...	FAA 7460 Review	90d	09-01-10	01-10-11	347d		EP0200	EP0250
EP0250	5d/Wk ...	Receive FAA 7460 Permit	0d		01-10-11	347d		EP0220	AA1110
Local Permits			360d	07-21-10	12-16-11	183d			
City of Vancouver Local Permitting			306d	07-21-10	09-30-11	237d			
Other Permits			285d	07-21-10	08-31-11	258d			
EP0500	7d/Wk	Conditional Use Permit for P&R	90d	07-21-10	10-18-10	688d		EN4900	DS6400, AA2420
EP0600	7d/Wk	Tree Plan Review & Permit Approval	120d	03-05-11	07-02-11	320d		EP1150	EP1000, AA1110, AA1510, AA1610, AA1710, AA2420
EP0700	7d/Wk	Archaeological Resources Approval	180d	03-05-11	08-31-11	260d		EP1150	EP1000, AA1110, AA1510, AA1610, AA1710, AA2420
EP0800	7d/Wk	Internal Circulation Permits Review & Approval	180d	03-05-11	08-31-11	260d		EP1150	EP1000, AA1110, AA1510, AA1610, AA1710, AA2420
EP0900	7d/Wk	Temporary Use Permits Review & Approval	180d	03-05-11	08-31-11	260d		EP1150	EP1000, AA1110, AA1510, AA1610, AA1710, AA2420



Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
EP1000	7d/Wk	Receive 'Other' Van Permits	0d		08-31-11	260d		EP0600, EP0700, EP0800, EP0900	AA1110, AA1610, AA1510, AA1710, AA2420
Vancouver Permits			169d	02-03-11	09-30-11	161d			
EP1150	7d/Wk	Prepare Land Use Permit Applications	30d	02-03-11	03-04-11	230d		PS1490	EP1200, EP1300, EP1400, EP1500, EP0600, EP0700, EP0800, EP0900
EP1200	7d/Wk	Shoreline Mgmt Act Condtional Use Permit Review & Approval	210d	03-05-11	09-30-11	230d		EP1150	AA1110
Critical Areas Ordinance Permit Review			126d	03-05-11	08-31-11	182d			
EP1300	7d/Wk	Floodplain Development Permit Review & Approval	180d	03-05-11	08-31-11	260d		EP1150	EP1600, AA1110
EP1400	7d/Wk	Geohazard Development Permit Review & Approval	180d	03-05-11	08-31-11	260d		EP1150	EP1600
EP1500	7d/Wk	Riparian Management Area Review & Approval	180d	03-05-11	08-31-11	260d		EP1150	EP1600
EP1600	7d/Wk	Receive Critical Areas Ordinance Permits	0d		08-31-11	260d		EP1300, EP1400, EP1500	AA1110, AA1710, AA2420
City of Portland Local Permitting			315d	09-23-10	12-16-11	107d			
Portland Local Permitting			169d	09-23-10	05-20-11	253d			
EP1850	7d/Wk	Prepare Conditional Use and E-Zone Permit Applications	30d	09-23-10	10-22-10	153d		PS1190	EP2000, EP2100, EP1900
EP1900	7d/Wk	Portland Historic Landmark Review & Approval	120d	10-23-10	02-19-11	453d		EP1850	AA1110, AA1410
EP2000	7d/Wk	Conditional Use Review & Approval	210d	10-23-10	05-20-11	363d		EP1850	AA1110, AA1410
EP2100	7d/Wk	Environmental Zones Review & Approval	210d	10-23-10	05-20-11	153d		EP1850	EP2350, AA1110, AA1410, AA2220
Site Development Review			146d	05-21-11	12-16-11	107d			
EP2350	7d/Wk	Prepare Site Development Permit Application (incl Design Rev at Expo)	30d	05-21-11	06-19-11	153d		EP2100	EP2400, EP2500, EP2600, EP2700
EP2400	7d/Wk	Tree Removal Permit Review & Approval	180d	06-20-11	12-16-11	153d		EP2350, PS1490	EP2800, AA1110, AA1410, AA2220
EP2500	7d/Wk	Grading Permit Review & Approval	180d	06-20-11	12-16-11	153d		EP2350, PS1490	EP2800, AA1110, AA1410, AA2220
EP2600	7d/Wk	Street Use Permit Review & Approval	180d	06-20-11	12-16-11	153d		EP2350, PS1490	EP2800, AA1110, AA1410, AA2220
EP2700	7d/Wk	Public Improvement Permit Review & Approval	180d	06-20-11	12-16-11	153d		EP2350, PS1490	EP2800
EP2800	5d/Wk ...	Receive Portland Site Development Permits	0d		12-16-11	107d		EP2400, EP2500, EP2600, EP2700	AA1110, AA1410, AA2220
Wetlands and Waters			661d	07-21-10	02-21-13	416d			
Coast Guard Approval			124d	07-21-10	01-17-11	343d			
EP3100	5d/Wk ...	Prepare & Submit Coast Guard Permit Application	21d	07-21-10	08-18-10	340d		EN4900, ST0710	EP3120
EP3120	7d/Wk	Coast Guard Review	150d	08-19-10	01-15-11	488d		EP3100	EP3150
EP3150	5d/Wk ...	Receive Coast Guard Permit	0d		01-17-11	343d		EP3120	AA1110, AA2220
USACE Clean Water Act NWP 15 (Section 404)			110d	02-03-11	07-08-11	220d			
EP3200	5d/Wk ...	Prepare JOINT PERMIT Applications	21d	02-03-11	03-03-11	218d		PS1490	EP3220, EP3400, EP3300, EP3500, EP3700, EP3600
EP3220	7d/Wk	Agency Review - USACE Clean Water Act 404	120d	03-04-11	07-01-11	321d		EP3200	EP3250
EP3250	5d/Wk ...	Receive Permit - USACE Clean Water Act 404	0d		07-08-11	220d		EP3220, EP4300, EP3750, EP3650	AA1110, AA1710, AA1410, AA2220
WDFW Hydraulic Project Approval (HPA)			63d	03-04-11	06-01-11	246d			
EP3300	5d/Wk ...	Submit Application - WDFW HPA	0d	03-04-11		245d		EP3200, PS1490	EP3320
EP3320	7d/Wk	Agency Review - WDFW HPA	90d	03-04-11	06-01-11	351d		EP3300	EP3350
EP3350	5d/Wk ...	Receive Permit - WDFW HPA	0d		06-01-11	246d		EP3320	AA1110, AA1710
DSL OR State Removal/Fill Permit			70d	03-04-11	06-13-11	239d			
EP3400	5d/Wk ...	Submit Application - DSL OR State Removal/Fill Permit	0d	03-04-11		237d		EP3200, PS1490	EP3420
EP3420	7d/Wk	Agency Review - DSL OR State Removal/Fill Permit	100d	03-04-11	06-11-11	341d		EP3400	EP3450
EP3450	5d/Wk ...	Receive Permit - DSL OR State Removal/Fill Permit	0d		06-13-11	239d		EP3420	AA1110, AA1410, AA2220
WDNR Aquatic Lands Use Authorization			85d	03-04-11	07-01-11	224d			
EP3500	5d/Wk ...	Submit Application - DNR Aquatic Lands Use Authorization	0d	03-04-11		223d		EP3200, PS1490	EP3520
EP3520	7d/Wk	Agency Review - DNR Aquatic Lands Use Authorization	120d	03-04-11	07-01-11	321d		EP3500	EP3550
EP3550	5d/Wk ...	Receive Permit - DNR Aquatic Lands Use Authorization	0d		07-01-11	224d		EP3520	AA1110
WA Ecology 401 Certification			85d	03-04-11	07-01-11	224d			
EP3600	5d/Wk ...	Submit Application - WA Ecology 401 Certification	0d	03-04-11		223d		EP3200, PS1490	EP3620
EP3620	7d/Wk	Agency Review - WA Ecology 401 Certification	120d	03-04-11	07-01-11	321d		EP3600	EP3650
EP3650	5d/Wk ...	Receive Permit - WA Ecology 401 Certification	0d		07-01-11	224d		EP3620	AA1110, AA1610, AA1510, AA1710, EP3800, EP3250, AA2420
DEQ OR 401 Certification			89d	03-04-11	07-08-11	220d			
EP3700	5d/Wk ...	Submit Application - DEQ OR 401 Certification	0d	03-04-11		218d		EP3200, PS1490	EP3710
EP3710	5d/Wk ...	Prepare Stormwater Management Plan	5d	03-04-11	03-10-11	218d		EP3700	EP3720
EP3720	7d/Wk	Agency Review - DEQ OR 401 Certification	120d	03-11-11	07-08-11	314d		EP3710	EP3750
EP3750	5d/Wk ...	Receive Permit - DEQ OR 401 Certification	0d		07-08-11	220d		EP3720	AA1110, AA1410, EP3250, AA2220
Section 402 NPDES Permit			83d	10-25-12	02-21-13	416d			
EP3800	7d/Wk	Section 402 NPDES Permit Review & Approval	120d	10-25-12	02-21-13	595d		DS6400, EP3650	AA1710
State Permits			800d	07-21-10	09-09-13	189d			
EP4100	5d/Wk ...	Air Quality Permit (DEQ) for Construction Activity Review & Approval	90d	07-21-10	11-24-10	544d		EN4900	RB1020, Hi1020, MD1020
EP4200	5d/Wk ...	Air Quality Permit (SWCAA) for Construction Activity Review & Approval	90d	07-21-10	11-24-10	544d		EN4900	RB1020, 141020, MP1020, 4P1020, 5H1020
EP4300	5d/Wk ...	Oregon Fish Passage Permit Review & Approval from ODFW	120d	07-21-10	01-10-11	337d		EN4900	EP3250
EP4600	5d/Wk ...	Underground Injection/NPDES Permit Rev & App (OR) for Dewatering	60d	06-14-13	09-09-13	189d		PS6490, PS1490	Hi1020, MD1020
EP4700	5d/Wk ...	Underground Injection/NPDES Permit Rev & App (WA) for Dewatering	60d	06-14-13	09-09-13	73d		PS6490, PS1490	141020, MP1020, 4P1020, 5H1020
DSL Waterways Leasing			106d	02-03-11	07-02-11	224d			
EP5100	7d/Wk	Prepare DSL Waterways Lease/Permit Application	30d	02-03-11	03-04-11	320d		PS1490	EP5200
EP5200	7d/Wk	DSL Waterways Lease Review & Approval	120d	03-05-11	07-02-11	320d		EP5100	AA1110, AA2220



Columbia River CROSSING

Actual Work

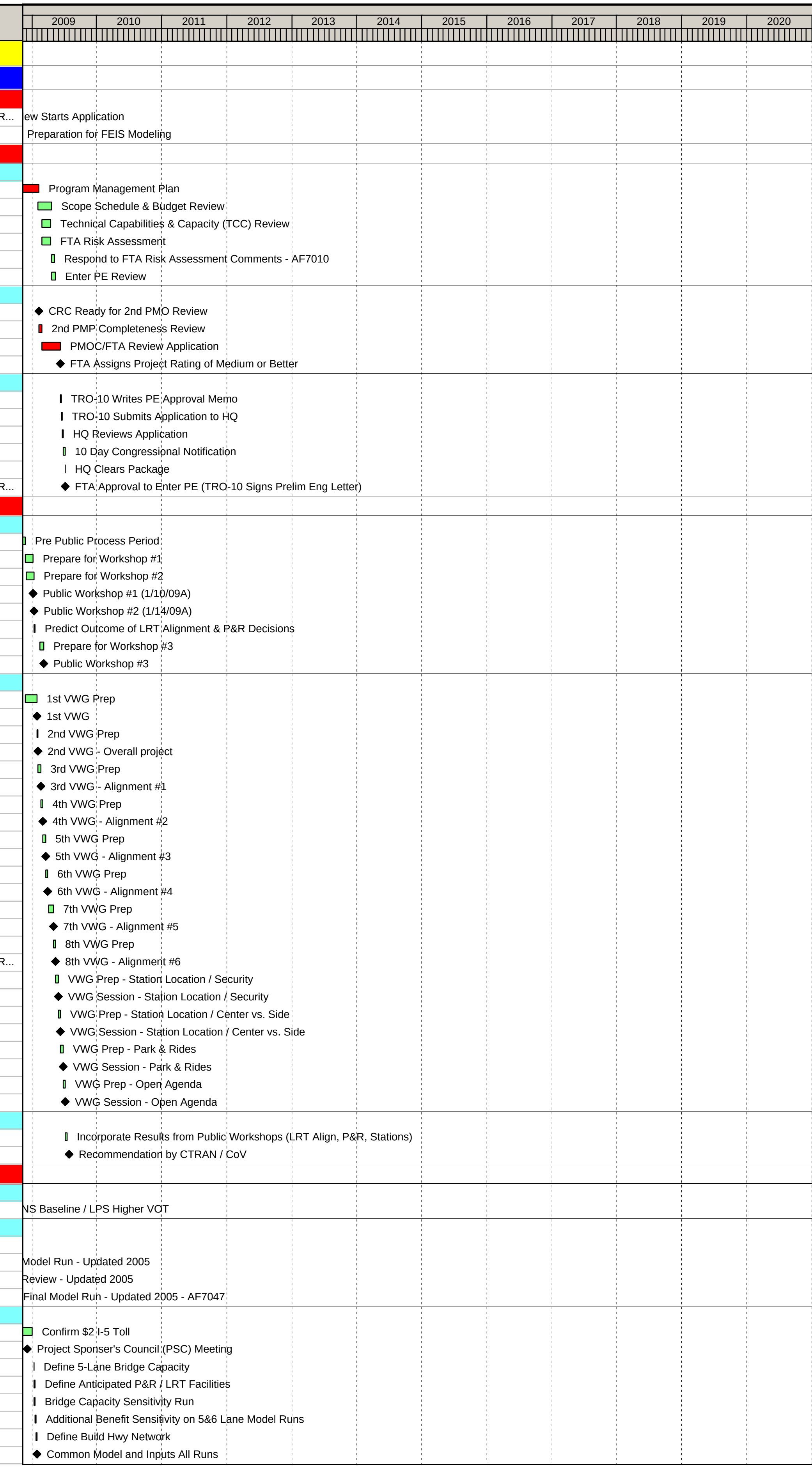
Remaining Level of Effort ◆ Milestone

Data Date: 09-01-08

Print Date/Time: 05-28-09 12:10

CRC Project Schedule (Baseline w/ current data through 4/22/09)

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
TRANSIT PLANNING & ENGINEERING			123...	08-15-08 A	07-02-13	739d			
TRANSIT PLANNING			116...	08-15-08 A	04-02-13	24d			
Transit General			31d	08-15-08 A	10-14-08	145d			
TR0010	5d/Wk ...	New Starts Application	0d	08-15-08 A					TR3000, TR0020, TR0190, TR0030, TR1560, TR0650, TR0660, TR0920, TR...
TR0020	5d/Wk ...	Preparation for FEIS Modeling	31d	08-18-08 A	10-14-08	145d		TR0010	TR1500
FTA Approval of Preliminary Engineering Request			217d	08-18-08 A	07-08-09	28d			
FTA/PMOC Pre PE LPA Review			178d	08-18-08 A	05-12-09	45d			
TR0030	5d/Wk ...	Program Management Plan	114d	08-18-08 A	02-11-09	0d		TR0010	TR0090, TR0050
TR0040	5d/Wk ...	Scope Schedule & Budget Review	57d	02-02-09	04-21-09	45d		TR0090	TR0080
TR0050	5d/Wk ...	Technical Capabilities & Capacity (TCC) Review	35d	02-25-09	04-14-09	50d		TR0100, TR0030	TR0080
TR0060	5d/Wk ...	FTA Risk Assessment	38d	02-25-09	04-17-09	47d		TR0100	TR0900, TR0070, TR0080
TR0070	5d/Wk ...	Respond to FTA Risk Assessment Comments - AF7010	15d	04-20-09	05-08-09	47d		TR0060	TR0130
TR0080	5d/Wk ...	Enter PE Review	15d	04-22-09	05-12-09	45d		TR0050, TR0040, TR0060	TR0130
FTA/PMOC Other			84d	02-12-09	06-10-09	0d			
TR0090	5d/Wk ...	CRC Ready for 2nd PMO Review	0d	02-12-09		0d		TR0030	TR0040, TR0100
TR0100	5d/Wk ...	2nd PMP Completeness Review	9d	02-12-09	02-24-09	0d		TR0090	TR0050, TR0060, TR0110
TR0110	5d/Wk ...	PMOC/FTA Review Application	75d	02-25-09	06-10-09	0d		TR0100	TR0120, RW2500
TR0120	5d/Wk ...	FTA Assigns Project Rating of Medium or Better	0d		06-10-09	0d		TR0110	TR0130, TR1930
FTA PE Approval			19d	06-11-09	07-08-09	28d			
TR0130	5d/Wk ...	TRO-10 Writes PE Approval Memo	4d	06-11-09	06-16-09	25d		TR0120, TR0070, TR0080	TR0140
TR0140	5d/Wk ...	TRO-10 Submits Application to HQ	3d	06-17-09	06-19-09	25d		TR0130	TR0150
TR0150	5d/Wk ...	HQ Reviews Application	5d	06-22-09	06-26-09	25d		TR0140	TR0160
TR0160	7d/Wk	10 Day Congressional Notification	10d	06-27-09	07-06-09	38d		TR0150	TR0170
TR0170	5d/Wk ...	HQ Clears Package	1d	07-07-09	07-07-09	28d		TR0160	TR0180
TR0180	5d/Wk ...	FTA Approval to Enter PE (TRO-10 Signs Prelim Eng Letter)	0d		07-08-09	28d		TR0170	TR4600, TR4630, TR4410, TR4420, TR4430, TR3840, TR3820, TR3700, TR...
Public Outreach - LRT Alignment, Park & Ride & Station Decisions			230d	08-18-08 A	07-27-09	20d			
Public Workshops			134d	08-18-08 A	03-11-09	116d			
TR0190	5d/Wk ...	Pre Public Process Period	62d	08-18-08 A	11-26-08	3d		TR0010	TR1530, TR1560, TR1630, TR3000, TR2200, TR0200, TR1740, TR0270
TR0200	5d/Wk ...	Prepare for Workshop #1	29d	11-28-08	01-09-09	5d		TR0190	TR0220, TR0210
TR0210	5d/Wk ...	Prepare for Workshop #2	30d	12-02-08	01-14-09	15d		TR0200	TR0230, TR0250
TR0220	5d/Wk ...	Public Workshop #1 (1/10/09A)	0d		01-09-09	5d		TR0200	TR0230, TR3020, TR0730, TR0720
TR0230	5d/Wk ...	Public Workshop #2 (1/14/09A)	0d		01-14-09	15d		TR0220, TR0210	TR0260, TR3020, TR0240
TR0240	5d/Wk ...	Predict Outcome of LRT Alignment & P&R Decisions	4d	01-15-09	01-20-09	15d		TR0230	TR1010, TR1110, TR0870, TR0890, TR1020, EN0200
TR0250	5d/Wk ...	Prepare for Workshop #3	18d	02-16-09	03-11-09	116d		TR0210	TR0260
TR0260	5d/Wk ...	Public Workshop #3	0d		03-11-09	116d		TR0230, TR0250	TR0620
Vancouver Working Group (VWG) Sessions			156d	11-28-08	07-09-09	25d			
TR0270	5d/Wk ...	1st VWG Prep	41d	11-28-08	01-27-09	3d		TR0190	TR0280
TR0280	5d/Wk ...	1st VWG	0d		01-27-09	3d		TR0270	TR0290
TR0290	5d/Wk ...	2nd VWG Prep	7d	01-28-09	02-05-09	3d		TR0280	TR0300
TR0300	5d/Wk ...	2nd VWG - Overall project	0d		02-05-09	3d		TR0290	TR0310
TR0310	5d/Wk ...	3rd VWG Prep	10d	02-06-09	02-19-09	3d		TR0300	TR0320
TR0320	5d/Wk ...	3rd VWG - Alignment #1	0d		02-19-09	3d		TR0310	TR0330
TR0330	5d/Wk ...	4th VWG Prep	10d	02-20-09	03-05-09	3d		TR0320	TR0340
TR0340	5d/Wk ...	4th VWG - Alignment #2	0d		03-05-09	3d		TR0330	TR0350
TR0350	5d/Wk ...	5th VWG Prep	10d	03-06-09	03-19-09	3d		TR0340	TR0360
TR0360	5d/Wk ...	5th VWG - Alignment #3	0d		03-19-09	3d		TR0350	TR0370
TR0370	5d/Wk ...	6th VWG Prep	10d	03-20-09	04-02-09	3d		TR0360	TR0380
TR0380	5d/Wk ...	6th VWG - Alignment #4	0d		04-02-09	3d		TR0370	TR1540, TR0390
TR0390	5d/Wk ...	7th VWG Prep	20d	04-03-09	04-30-09	3d		TR0380	TR0400
TR0400	5d/Wk ...	7th VWG - Alignment #5	0d		04-30-09	3d		TR0390	TR0410
TR0410	5d/Wk ...	8th VWG Prep	10d	05-01-09	05-14-09	3d		TR0400	TR0420
TR0420	5d/Wk ...	8th VWG - Alignment #6	0d		05-14-09	3d		TR0410	TR0450, TR1750, TR1740, TR1670, TR1680, TR1690, TR1720, TR1700, TR...
TR0450	5d/Wk ...	VWG Prep - Station Location / Security	9d	05-15-09	05-28-09	17d		TR0420	TR0460
TR0460	5d/Wk ...	VWG Session - Station Location / Security	0d		05-28-09	17d		TR0450	TR0490
TR0490	5d/Wk ...	VWG Prep - Station Location / Center vs. Side	10d	05-29-09	06-11-09	17d		TR0460	TR0500
TR0500	5d/Wk ...	VWG Session - Station Location / Center vs. Side	0d		06-11-09	17d		TR0490	TR0530
TR0530	5d/Wk ...	VWG Prep - Park & Rides	10d	06-12-09	06-25-09	17d		TR0500	TR0540
TR0540	5d/Wk ...	VWG Session - Park & Rides	0d		06-25-09	17d		TR0530	TR0570, EN0290
TR0570	5d/Wk ...	VWG Prep - Open Agenda	9d	06-26-09	07-09-09	25d		TR0540	TR0580
TR0580	5d/Wk ...	VWG Session - Open Agenda	0d		07-09-09	25d		TR0570	TR0610
Public Outreach Results			12d	07-10-09	07-27-09	20d			
TR0610	5d/Wk ...	Incorporate Results from Public Workshops (LRT Align, P&R, Stations)	7d	07-10-09	07-20-09	25d		TR0580	TR0620, UT1300
TR0620	5d/Wk ...	Recommendation by CTRAN / CoV	0d		07-27-09	20d		TR0610, TP1510, TR0260	TR4600
Transit Service Planning and Analysis (7.5)			302d	08-18-08 A	11-05-09	4d			
NS Baseline / LPS Higher VOT			9d	08-18-08 A	09-12-08	10d			
TR0650	5d/Wk ...	NS Baseline / LPS Higher VOT	9d	08-18-08 A	09-12-08	10d		TR0010	TR0690
Updated 2005			14d	08-18-08 A	09-19-08	10d			
TR0660	5d/Wk ...	Network Coding - Updated 2005	0d	08-18-08 A	08-27-08 A			TR0010	TR0670
TR0670	5d/Wk ...	Model Run - Updated 2005	7d	08-28-08 A	09-10-08	10d		TR0660	TR0680
TR0680	5d/Wk ...	Review - Updated 2005	2d	09-11-08	09-12-08	10d		TR0670	TR0690
TR0690	5d/Wk ...	Final Model Run - Updated 2005 - AF7047	5d	09-15-08	09-19-08	10d		TR0680, TR0650	TR0920
Updated Build - Summit			171d	08-18-08 A	05-01-09	110d			
TR0700	5d/Wk ...	Confirm $2 I-5 Toll	86d	08-18-08 A	01-02-09	25d		TR0010	TR1150, TR0770
TR0710	5d/Wk ...	Project Sponser's Council (PSC) Meeting	0d	12-05-08		29d		PM1010	TR0720
TR0720	5d/Wk ...	Define 5-Lane Bridge Capacity	1d	01-12-09	01-12-09	5d		TR0710, TR0220	TR0740
TR0730	5d/Wk ...	Define Anticipated P&R / LRT Facilities	5d	01-12-09	01-16-09	10d		TR0220	TR0760
TR0740	5d/Wk ...	Bridge Capacity Sensitivity Run	4d	01-13-09	01-16-09	5d		TR0940, TR0720	TR0750
TR0750	5d/Wk ...	Additional Benefit Sensitivity on 5&6 Lane Model Runs	5d	01-19-09	01-23-09	5d		TR0740	TR0760
TR0760	5d/Wk ...	Define Build Hwy Network	5d	01-26-09	01-30-09	5d		TR0750, TR0730	TR0770, TR1150
TR0770	5d/Wk ...	Common Model and Inputs All Runs	0d		01-30-09	5d		TR0700, TR0760	TR0780, TR0880



Columbia River CROSSING

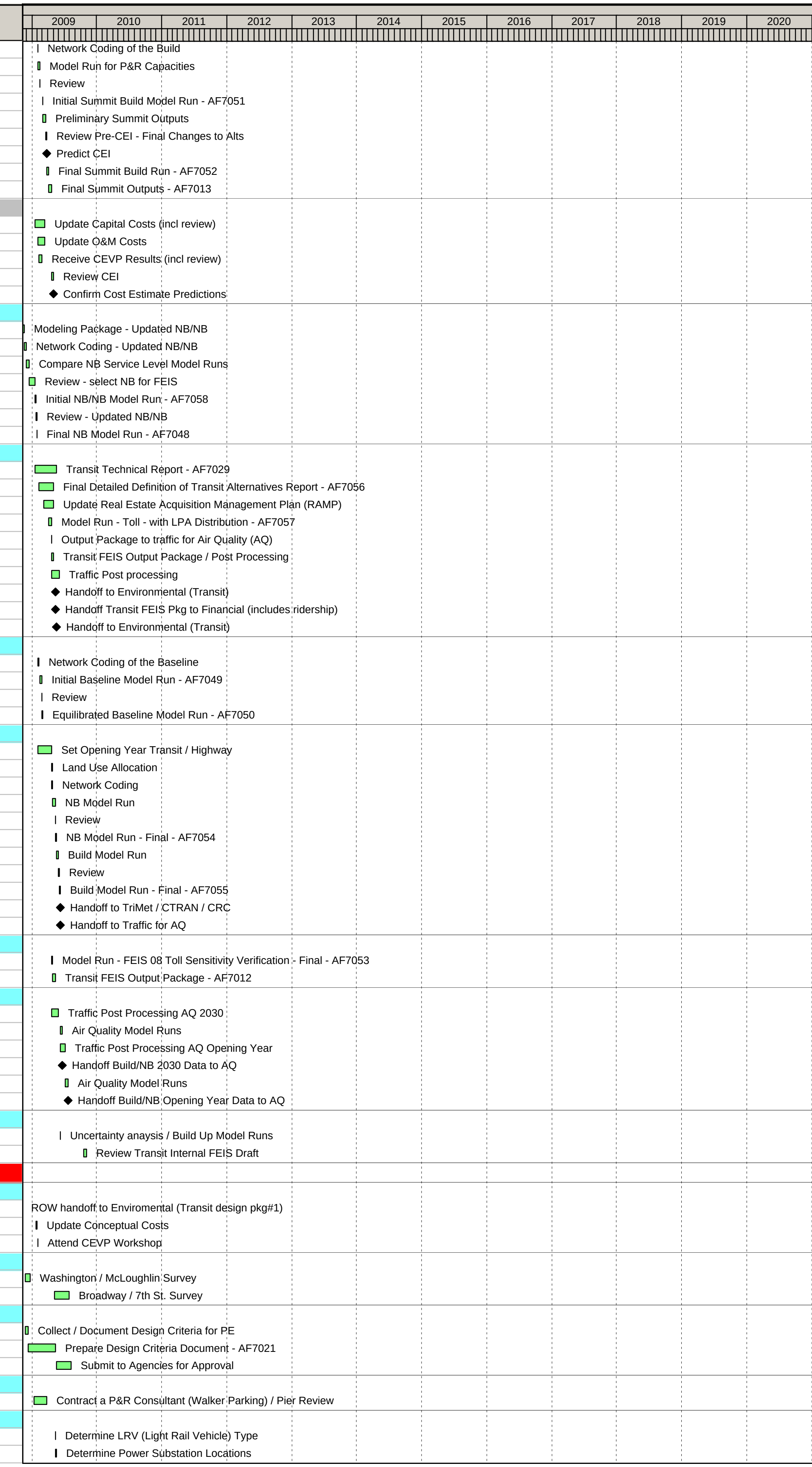
Remaining Work | Critical Remaining Work | Actual Work | Remaining Level of Effort | Milestone

Data Date: 09-01-08

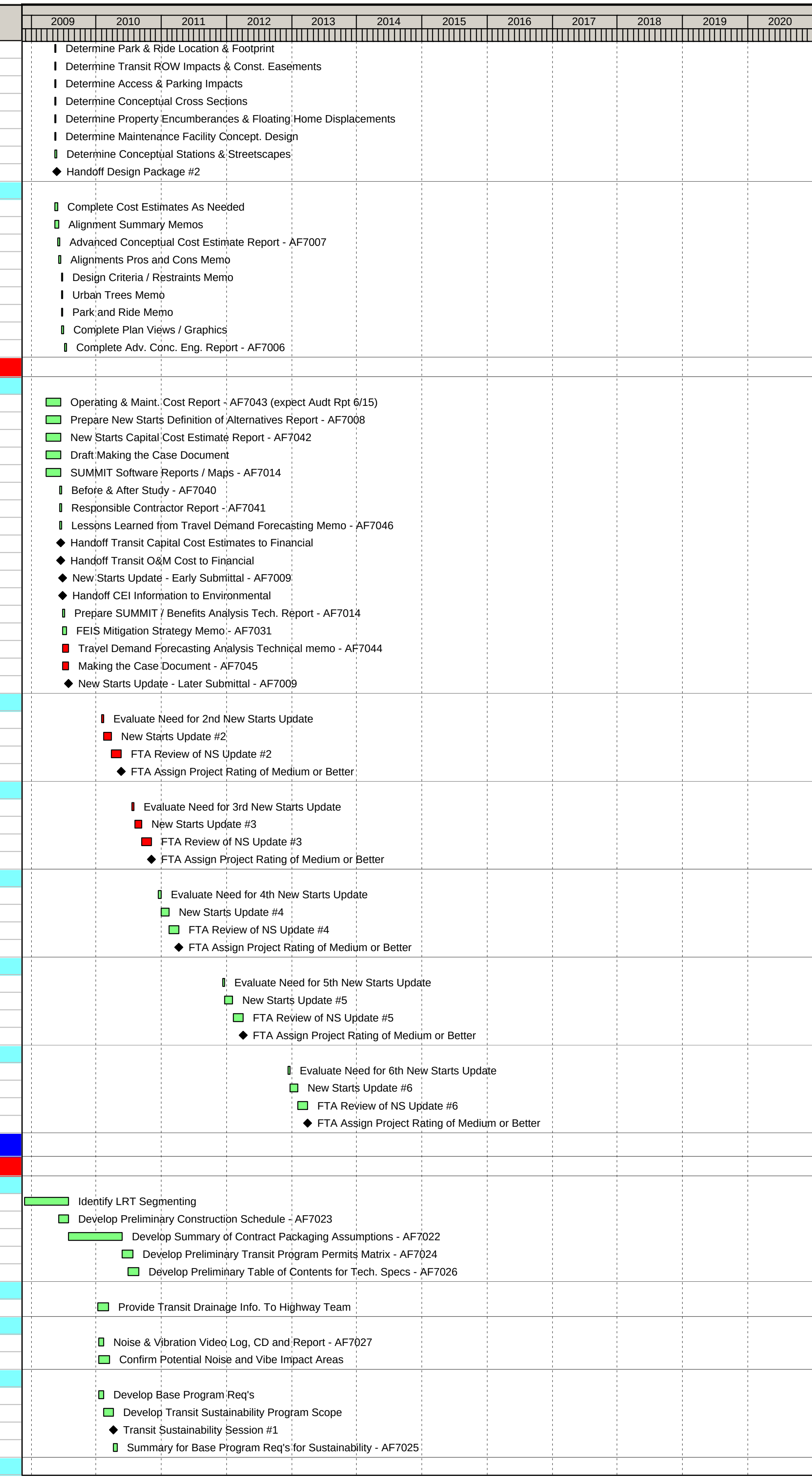
Print Date/Time: 05-28-09 12:10

CRC Project Schedule (Baseline w/ current data through 4/22/09)

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
TR0780	5d/Wk ...	Network Coding of the Build	4d	02-02-09	02-05-09	5d		TP1410, TR0770	TR1110, TR0790, TP1110
TR0790	5d/Wk ...	Model Run for P&R Capacities	6d	02-06-09	02-13-09	5d		TR0980, TR0780	TR0800
TR0800	5d/Wk ...	Review	2d	02-16-09	02-17-09	5d		TR0790	TR1120
TR0810	5d/Wk ...	Initial Summit Build Model Run - AF7051	3d	03-03-09	03-05-09	5d		TR1140	TR0820
TR0820	5d/Wk ...	Preliminary Summit Outputs	10d	03-06-09	03-19-09	5d		TR0810	TR0830, TR0900
TR0830	5d/Wk ...	Review Pre-CEI - Final Changes to Alts	5d	03-20-09	03-26-09	5d		TR0820	TR0850, TR0840
TR0840	5d/Wk ...	Predict CEI	0d		03-26-09	5d		TR0870, TR0830	TR1030, FN1570, TR1840, TR1850, TR1830, TR1860, TR1870, TR0850
TR0850	5d/Wk ...	Final Summit Build Run - AF7052	8d	03-27-09	04-07-09	12d		TR0830, TR0840	TR0860, TR1030
TR0860	5d/Wk ...	Final Summit Outputs - AF7013	10d	04-08-09	04-21-09	45d		TR0850	TR1930
Update Costs			73d	01-21-09	05-01-09	110d			
TR0870	5d/Wk ...	Update Capital Costs (incl review)	37d	01-21-09	03-12-09	15d		TR0240	TR0840
TR0880	5d/Wk ...	Update O&M Costs	29d	02-02-09	03-12-09	136d		TR0770	TR0900
TR0890	5d/Wk ...	Receive CEVP Results (incl review)	15d	02-09-09	02-27-09	145d		TR1520, TR0240, PM1130	TR0900
TR0900	5d/Wk ...	Review CEI	10d	04-20-09	05-01-09	110d		TR0820, TR0060, TR0890, TR0880	TR0910
TR0910	5d/Wk ...	Confirm Cost Estimate Predictions	0d		05-01-09	110d		TR0900	TR1070
Updated NB/NB			74d	10-15-08	01-29-09	10d			
TR0920	5d/Wk ...	Modeling Package - Updated NB/NB	25d	10-15-08	11-18-08	10d		TR0010, TR0690	TR0930
TR0930	5d/Wk ...	Network Coding - Updated NB/NB	8d	11-19-08	12-01-08	10d		TR0920	TR0940
TR0940	5d/Wk ...	Compare NB Service Level Model Runs	11d	12-02-08	12-16-08	10d		TR0930	TR0950, TR0740
TR0950	5d/Wk ...	Review - select NB for FEIS	22d	12-17-08	01-19-09	10d		TR0940	TR0960
TR0960	5d/Wk ...	Initial NB/NB Model Run - AF7058	4d	01-20-09	01-23-09	10d		TR0950	TR0970
TR0970	5d/Wk ...	Review - Updated NB/NB	2d	01-26-09	01-27-09	10d		TR0960	TR0980
TR0980	5d/Wk ...	Final NB Model Run - AF7048	2d	01-28-09	01-29-09	10d		TR0970	TR0790
Updated Build - FEIS			95d	01-21-09	06-03-09	88d			
TR1000	5d/Wk ...	Transit Technical Report - AF7029	85d	01-21-09	05-19-09	28d		TR1050	TR1090
TR1010	5d/Wk ...	Final Detailed Definition of Transit Alternatives Report - AF7056	61d	02-10-09	05-05-09	35d		TR0240, TR1050	TR1930
TR1020	5d/Wk ...	Update Real Estate Acquisition Management Plan (RAMP)	42d	03-09-09	05-05-09	35d		TR0240, TR1050	TR1930
TR1030	5d/Wk ...	Model Run - Toll - with LPA Distribution - AF7057	10d	04-08-09	04-21-09	12d		TR0840, TR0850	TR1050, TR1060, TR1260, TR1040
TR1040	5d/Wk ...	Output Package to traffic for Air Quality (AQ)	2d	04-22-09	04-23-09	12d		TR1030	TR1300
TR1050	5d/Wk ...	Transit FEIS Output Package / Post Processing	10d	04-22-09	05-05-09	28d		TR1030	TR1000, TR1010, TR1090, TR1020
TR1060	5d/Wk ...	Traffic Post processing	30d	04-22-09	06-03-09	53d		TR1030	TP1950
TR1070	5d/Wk ...	Handoff to Environmental (Transit)	0d		05-12-09	103d		TR1270, TR0910	EN4100
TR1080	5d/Wk ...	Handoff Transit FEIS Pkg to Financial (includes ridership)	0d		05-12-09	38d		TR1270	FN1500
TR1090	5d/Wk ...	Handoff to Environmental (Transit)	0d		05-19-09	28d		TR1050, TR1000	EN0240, EN4100
Updated Baseline			17d	02-06-09	03-02-09	5d			
TR1110	5d/Wk ...	Network Coding of the Baseline	4d	02-06-09	02-11-09	9d		TR0240, TR0780	TR1120, TR1130, TR1140
TR1120	5d/Wk ...	Initial Baseline Model Run - AF7049	5d	02-18-09	02-24-09	5d		TR1110, TR0800	TR1130
TR1130	5d/Wk ...	Review	2d	02-25-09	02-26-09	5d		TR1110, TR1120	TR1140
TR1140	5d/Wk ...	Equilibrated Baseline Model Run - AF7050	2d	02-27-09	03-02-09	5d		TR1110, TR1130	TR0810
Opening Year			90d	02-02-09	06-08-09	37d			
TR1150	5d/Wk ...	Set Opening Year Transit / Highway	56d	02-02-09	04-20-09	5d		TR0700, TR0760	TR1160
TR1160	5d/Wk ...	Land Use Allocation	5d	04-21-09	04-27-09	5d		TR1150	TR1170
TR1170	5d/Wk ...	Network Coding	5d	04-21-09	04-27-09	5d		TR1160	TR1180
TR1180	5d/Wk ...	NB Model Run	10d	04-28-09	05-11-09	5d		TR1170	TR1190
TR1190	5d/Wk ...	Review	2d	05-12-09	05-13-09	5d		TR1180	TR1200
TR1200	5d/Wk ...	NB Model Run - Final - AF7054	3d	05-14-09	05-18-09	5d		TR1190	TR1210
TR1210	5d/Wk ...	Build Model Run	9d	05-19-09	06-01-09	5d		TR1200	TR1220, TR1340
TR1220	5d/Wk ...	Review	2d	06-02-09	06-03-09	5d		TR1210	TR1230
TR1230	5d/Wk ...	Build Model Run - Final - AF7055	3d	06-04-09	06-08-09	5d		TR1220	TR1240, TR1420, TR1880, TR1890, TR1900, TR1320, TR1250
TR1240	5d/Wk ...	Handoff to TriMet / CTRAN / CRC	0d		06-08-09	37d		TR1230	TR1420
TR1250	5d/Wk ...	Handoff to Traffic for AQ	0d		06-08-09	5d		TR1230	TR1340, TP1320
Tolling Verification Runs			15d	04-22-09	05-12-09	38d			
TR1260	5d/Wk ...	Model Run - FEIS 08 Toll Sensitivity Verification - Final - AF7053	5d	04-22-09	04-28-09	28d		TR1030	TR1320, TR1270, TP1130
TR1270	5d/Wk ...	Transit FEIS Output Package - AF7012	10d	04-29-09	05-12-09	38d		TR1260	TR1070, EN0250, TR1080
Air Quality Model Runs			63d	04-24-09	07-23-09	8d			
TR1300	5d/Wk ...	Traffic Post Processing AQ 2030	24d	04-24-09	05-28-09	12d		TR1040	TR1320
TR1320	5d/Wk ...	Air Quality Model Runs	10d	06-09-09	06-22-09	5d		TR1260, TR1300, TR1230	TR1360
TR1340	5d/Wk ...	Traffic Post Processing AQ Opening Year	22d	06-09-09	07-09-09	8d		TR1210, TR1250	TR1380
TR1360	5d/Wk ...	Handoff Build/NB 2030 Data to AQ	0d		06-22-09	5d		TP1140, TP1130, TR1320	EN4100, EN0280
TR1380	5d/Wk ...	Air Quality Model Runs	10d	07-10-09	07-23-09	8d		TR1340	TR1400
TR1400	5d/Wk ...	Handoff Build/NB Opening Year Data to AQ	0d		07-23-09	8d		TR1380	EN0310
Other Transit Analysis			106d	06-09-09	11-05-09	4d			
TR1420	5d/Wk ...	Uncertainty anaysis / Build Up Model Runs	0d	06-09-09	06-09-09	37d		TR1230, TR1240	TR1990, EN4100
TR1460	5d/Wk ...	Review Transit Internal FEIS Draft	11d	10-22-09	11-05-09	4d		EN4100	EN4210
Advanced Conceptual Engineering (7.3)			208d	10-15-08	08-07-09	17d			
Adv Concept Eng Misc			80d	10-15-08	02-06-09	145d			
TR1500	5d/Wk ...	ROW handoff to Enviromental (Transit design pkg#1)	14d	10-15-08	11-03-08	145d		TR0020	EN0120, TR1510
TR1510	5d/Wk ...	Update Conceptual Costs	5d	01-26-09	01-30-09	145d		TR1500	TR1520
TR1520	5d/Wk ...	Attend CEVP Workshop	5d	02-02-09	02-06-09	145d		TR1510	TR0890
Surveying and Mapping for Transit			171d	11-28-08	07-30-09	17d			
TR1530	5d/Wk ...	Washington / McLoughlin Survey	17d	11-28-08	12-22-08	171d		TR0190	TR4630, TR4600, RE1240
TR1540	5d/Wk ...	Broadway / 7th St. Survey	58d	05-08-09	07-30-09	17d		TR0380	TR4600
Design Criteria Summary Report			177d	11-28-08	08-07-09	11d			
TR1560	5d/Wk ...	Collect / Document Design Criteria for PE	10d	11-28-08	12-11-08	11d		TR0010, TR0190	TR1570, TR4630
TR1570	5d/Wk ...	Prepare Design Criteria Document - AF7021	109d	12-12-08	05-15-09	11d		TR1560	TR1600
TR1600	5d/Wk ...	Submit to Agencies for Approval	58d	05-18-09	08-07-09	11d		TR1570	TR4600
P&R External Review			49d	01-15-09	03-24-09	92d			
TR1630	5d/Wk ...	Contract a P&R Consultant (Walker Parking) / Pier Review	49d	01-15-09	03-24-09	92d		TR0190	TR4410, TR4420, TR4430, TR4400, TR1800
Transit Environmental Design Package #2			8d	05-15-09	05-27-09	3d			
TR1640	5d/Wk ...	Determine LRV (Light Rail Vehicle) Type	1d	05-15-09	05-15-09	10d		TR0420	TR1730
TR1650	5d/Wk ...	Determine Power Substation Locations	2d	05-15-09	05-18-09	9d		TR0420	TR1730



Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
TR1660	5d/Wk ...	Determine Park & Ride Location & Footprint	3d	05-15-09	05-19-09	8d		TR0420	TR1730
TR1670	5d/Wk ...	Determine Transit ROW Impacts & Const. Easements	5d	05-15-09	05-21-09	6d		TR0420	TR1730
TR1680	5d/Wk ...	Determine Access & Parking Impacts	5d	05-15-09	05-21-09	6d		TR0420	TR1730
TR1690	5d/Wk ...	Determine Conceptual Cross Sections	5d	05-15-09	05-21-09	6d		TR0420	TR1730
TR1700	5d/Wk ...	Determine Property Encumberances & Floating Home Displacements	5d	05-15-09	05-21-09	6d		TR0420	TR1730
TR1710	5d/Wk ...	Determine Maintenance Facility Concept. Design	5d	05-15-09	05-21-09	6d		TR0420	TR1730
TR1720	5d/Wk ...	Determine Conceptual Stations & Streetscapes	8d	05-15-09	05-27-09	3d		TR0420	TR1730
TR1730	5d/Wk ...	Handoff Design Package #2	0d		05-27-09	3d		TR1670, TR1680, TR1690, TR1720, TR1700, TR1710, TR1660, TR1650, T...	EN0270
Design Documentation Binder			44d	05-15-09	07-17-09	26d			
TR1740	5d/Wk ...	Complete Cost Estimates As Needed	10d	05-15-09	05-29-09	40d		TR0190, TR0420	TR1820, TR1760
TR1750	5d/Wk ...	Alignment Summary Memos	14d	05-15-09	06-04-09	26d		TR0420	TR1770
TR1760	5d/Wk ...	Advanced Conceptual Cost Estimate Report - AF7007	10d	06-01-09	06-12-09	40d		TR1740	TR1820
TR1770	5d/Wk ...	Alignments Pros and Cons Memo	10d	06-05-09	06-18-09	26d		TR1750	TR1780, TR1790, TR1800, TR1810
TR1780	5d/Wk ...	Design Criteria / Restraints Memo	5d	06-19-09	06-25-09	31d		TR1770	TR1820
TR1790	5d/Wk ...	Urban Trees Memo	5d	06-19-09	06-25-09	31d		TR1770	TR1820
TR1800	5d/Wk ...	Park and Ride Memo	5d	06-19-09	06-25-09	31d		TR1770, TR1630	TR1820
TR1810	5d/Wk ...	Complete Plan Views / Graphics	10d	06-19-09	07-02-09	26d		TR1770	TR1820
TR1820	5d/Wk ...	Complete Adv. Conc. Eng. Report - AF7006	10d	07-06-09	07-17-09	26d		TR1780, TR1790, TR1800, TR1810, TR1740, TR1760	TR4600
Update FTA New Starts Application (7.4)			102...	03-27-09	04-02-13	24d			
Initial New Starts Update			88d	03-27-09	07-30-09	43d			
TR1830	5d/Wk ...	Operating & Maint. Cost Report - AF7043 (expect Audt Rpt 6/15)	56d	03-27-09	06-15-09	7d		TR0840	TR1940, TR1920
TR1840	5d/Wk ...	Prepare New Starts Definition of Alternatives Report - AF7008	58d	03-27-09	06-17-09	5d		TR0840	TR1930
TR1850	5d/Wk ...	New Starts Capital Cost Estimate Report - AF7042	58d	03-27-09	06-17-09	5d		TR0840	TR1930, TR1910
TR1860	5d/Wk ...	Draft Making the Case Document	58d	03-27-09	06-17-09	5d		TR0840	TR1970
TR1870	5d/Wk ...	SUMMIT Software Reports / Maps - AF7014	58d	03-27-09	06-17-09	5d		TR0840	TR1980
TR1880	5d/Wk ...	Before & After Study - AF7040	10d	06-09-09	06-22-09	27d		TR1230	TR1990
TR1890	5d/Wk ...	Responsible Contractor Report - AF7041	10d	06-09-09	06-22-09	27d		TR1230	TR1990
TR1900	5d/Wk ...	Lessons Learned from Travel Demand Forecasting Memo - AF7046	10d	06-09-09	06-22-09	27d		TR1230	TR1990
TR1910	5d/Wk ...	Handoff Transit Capital Cost Estimates to Financial	0d		06-15-09	16d		TR1850	FN1500
TR1920	5d/Wk ...	Handoff Transit O&M Cost to Financial	0d		06-15-09	15d		TR1830	FN1500
TR1930	5d/Wk ...	New Starts Update - Early Submittal - AF7009	0d	06-25-09*		0d	06-25-09	TR1010, TR1840, TR1850, TR1020, TR0120, TR0860	TR1940, TR1980, TR1950, TR1960
TR1940	5d/Wk ...	Handoff CEI Information to Environmental	0d	06-25-09		0d		TR1830, TR1930	TR1970, EN3700
TR1950	5d/Wk ...	Prepare SUMMIT / Benefits Analysis Tech. Report - AF7014	8d	06-25-09	07-07-09	17d		TR1930	TR1990
TR1960	5d/Wk ...	FEIS Mitigation Strategy Memo - AF7031	15d	06-25-09	07-16-09	53d		TR1930	EN4100
TR1970	5d/Wk ...	Travel Demand Forecasting Analysis Technical memo - AF7044	25d	06-25-09	07-30-09	0d		TR1860, TR1940	TR1990
TR1980	5d/Wk ...	Making the Case Document - AF7045	25d	06-25-09	07-30-09	0d		TR1870, TR1930	TR1990
TR1990	5d/Wk ...	New Starts Update - Later Submittal - AF7009	0d		07-30-09*	0d	07-30-09	TR1970, TR1980, TR1950, TR1420, TR1880, TR1890, TR1900	TR2000
2nd New Starts Update			80d	01-29-10	05-20-10	0d			
TR2000	5d/Wk ...	Evaluate Need for 2nd New Starts Update	10d	01-29-10	02-11-10	0d		TR1990	TR2040, TR2010
TR2010	5d/Wk ...	New Starts Update #2	30d	02-12-10	03-25-10	0d		TR2000	TR2020
TR2020	5d/Wk ...	FTA Review of NS Update #2	40d	03-26-10	05-20-10	0d		TR2010	TR2030
TR2030	5d/Wk ...	FTA Assign Project Rating of Medium or Better	0d		05-20-10*	0d	06-24-10	TR2020	TR2040
3rd New Starts Update			80d	07-20-10	11-09-10	0d			
TR2040	5d/Wk ...	Evaluate Need for 3rd New Starts Update	10d	07-20-10	08-02-10	0d		TR2000, TR2030	TR5600, TR2050
TR2050	5d/Wk ...	New Starts Update #3	30d	08-03-10	09-14-10	0d		TR2040	TR2060
TR2060	5d/Wk ...	FTA Review of NS Update #3	40d	09-15-10	11-09-10	0d		TR2050	TR2070
TR2070	5d/Wk ...	FTA Assign Project Rating of Medium or Better	0d		11-09-10	0d		TR2060	TR2080, TR5000
4th New Starts Update			80d	12-16-10	04-08-11	24d			
TR2080	5d/Wk ...	Evaluate Need for 4th New Starts Update	10d	12-16-10	12-30-10	24d		TR2070	TR2090
TR2090	5d/Wk ...	New Starts Update #4	30d	01-03-11	02-11-11	24d		TR2080	TR2100
TR2100	5d/Wk ...	FTA Review of NS Update #4	40d	02-14-11	04-08-11	24d		TR2090	TR2110
TR2110	5d/Wk ...	FTA Assign Project Rating of Medium or Better	0d		04-08-11*	24d	06-23-11	TR2100	TR2120
5th New Starts Update			80d	12-09-11	04-02-12	24d			
TR2120	5d/Wk ...	Evaluate Need for 5th New Starts Update	10d	12-09-11	12-22-11	24d		TR2110	TR2130
TR2130	5d/Wk ...	New Starts Update #5	30d	12-23-11	02-06-12	24d		TR2120	TR2140
TR2140	5d/Wk ...	FTA Review of NS Update #5	40d	02-07-12	04-02-12	24d		TR2130	TR2150
TR2150	5d/Wk ...	FTA Assign Project Rating of Medium or Better	0d		04-02-12*	24d	06-28-12	TR2140	TR2160, TR5300
6th New Starts Update			80d	12-10-12	04-02-13	24d			
TR2160	5d/Wk ...	Evaluate Need for 6th New Starts Update	10d	12-10-12	12-21-12	24d		TR2150	TR2170
TR2170	5d/Wk ...	New Starts Update #6	30d	12-24-12	02-05-13	24d		TR2160	TR2180
TR2180	5d/Wk ...	FTA Review of NS Update #6	40d	02-06-13	04-02-13	24d		TR2170	TR2190
TR2190	5d/Wk ...	FTA Assign Project Rating of Medium or Better	0d		04-02-13*	24d	06-27-13	TR2180	TR5600
TRANSIT ENGINEERING			117...	11-28-08	07-02-13	739d			
Transit Preliminary Eng. Coordination (7.11)			446d	11-28-08	08-27-10	34d			
7.11.1 - Project Construction Packaging / Sequencing			446d	11-28-08	08-27-10	11d			
TR2200	5d/Wk ...	Identify LRT Segmenting	169d	11-28-08	07-28-09	34d		TR0010, TR0190	TR2220, TR2210
TR2210	5d/Wk ...	Develop Preliminary Construction Schedule - AF7023	39d	06-03-09	07-28-09	246d		TR2200	TR2250
TR2220	5d/Wk ...	Develop Summary of Contract Packaging Assumptions - AF7022	212d	07-29-09	05-26-10	34d		TR2200	TR2250
TR2250	5d/Wk ...	Develop Preliminary Transit Program Permits Matrix - AF7024	42d	05-27-10	07-27-10	34d		TR2210, TR2220	TR4910
TR2260	5d/Wk ...	Develop Preliminary Table of Contents for Tech. Specs - AF7026	42d	06-30-10	08-27-10	11d		TR4630	TR4910
7.11.4 - Drainage / Storm Water Management Plan			42d	01-11-10	03-09-10	114d			
TR2300	5d/Wk ...	Provide Transit Drainage Info. To Highway Team	42d	01-11-10	03-09-10	114d		TR4600	SW1200, SW2100, SW1500
7.11.5 - Noise and Vibration Mitigation			42d	01-15-10	03-15-10	151d			
TR2320	5d/Wk ...	Noise & Vibration Video Log, CD and Report - AF7027	19d	01-15-10	02-10-10	151d		TR2330	TR4910
TR2330	5d/Wk ...	Confirm Potential Noise and Vibe Impact Areas	42d	01-15-10	03-15-10	151d		TR4630	TR2320
7.11.3 - Sustainability Reviews			73d	01-15-10	04-27-10	97d			
TR2340	5d/Wk ...	Develop Base Program Req's	19d	01-15-10	02-10-10	97d		TR0180, TR4630	TR2350
TR2350	5d/Wk ...	Develop Transit Sustainability Program Scope	39d	02-11-10	04-06-10	97d		TR2340	TR2360
TR2360	5d/Wk ...	Transit Sustainability Session #1	0d		04-06-10	97d		TR3130, TR2350	TR2370
TR2370	5d/Wk ...	Summary for Base Program Req's for Sustainability - AF7025	15d	04-07-10	04-27-10	97d		TR2360	TR4910, TR4910
7.11.2 - Public / Private Utility Coordination			64d	05-10-10	08-09-10	25d			



Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
TR2380	5d/Wk ...	Identify Preliminary Water Service Locations / Service Levels	39d	05-10-10	07-02-10	50d		TR3360	TR4910
TR2390	5d/Wk ...	Identify Preliminary Power Feed Locations / Service Level Req's	39d	06-15-10	08-09-10	25d		TR3760	TR4910
Columbia River Bridge (CRB) Transit Design			189d	07-09-09	04-05-10	215d			
TR2500	5d/Wk ...	50% CRB Transit Design Development	86d	07-09-09	11-06-09	183d		TR0180	TR2540, ST1400
TR2540	5d/Wk ...	50% CRB Transit Design Agency/Project Review	20d	11-09-09	12-07-09	215d		TR2500	TR2580
TR2580	5d/Wk ...	90% CRB Transit Design Development	43d	12-08-09	02-08-10	215d		TR2540	TR2620
TR2620	5d/Wk ...	90% CRB Transit Design Agency/Project Review	20d	02-09-10	03-08-10	215d		TR2580	TR2660
TR2660	5d/Wk ...	100% CRB Transit Design Development	20d	03-09-10	04-05-10	215d		TR2620	TR2700
TR2700	5d/Wk ...	100% Transit CRB Design Package Complete	0d		04-05-10	215d		TR2660	ST1600
Prelim. Engineering Special Studies / Reviews (7.10)			213d	07-09-09	05-07-10	17d			
7.10.2 - Safety and Security (FLS) Review			72d	07-09-09	10-19-09	94d			
TR2720	5d/Wk ...	Develop Base Program Req's	19d	07-09-09	08-04-09	94d		TR0180	TR2730
TR2730	5d/Wk ...	Develop FLS Program Scope	10d	08-05-09	08-18-09	94d		TR2720	TR2740
TR2740	5d/Wk ...	Develop FLS First Responders / Representatives	29d	08-19-09	09-29-09	94d		TR2730	TR2750
TR2750	5d/Wk ...	FLS Session #1	0d		09-29-09	94d		TR2740	TR2760, TR2770
TR2760	5d/Wk ...	Incorporate Rec's	10d	09-30-09	10-13-09	98d		TR2750	TR3360
TR2770	5d/Wk ...	FLS Program Summary of PE Findings / Rec's - AF7020	14d	09-30-09	10-19-09	94d		TR2750	TR3360
7.10.1 - CPTED Review			81d	01-15-10	05-07-10	17d			
TR2780	5d/Wk ...	Develop Base Program Req's	19d	01-15-10	02-10-10	17d		TR4630, TR0180	TR2790
TR2790	5d/Wk ...	Develop CPTED Scope and Standing Members	19d	02-11-10	03-09-10	17d		TR2780	TR2800
TR2800	5d/Wk ...	CPTED Session #1	0d		03-09-10	17d		TR2790	TR2810
TR2810	5d/Wk ...	CPTED Review	19d	03-10-10	04-05-10	17d		TR3160, TR2800	TR2820
TR2820	5d/Wk ...	Incorporate Rec's	10d	04-06-10	04-19-10	17d		TR2810	TR2830
TR2830	5d/Wk ...	CPTED Program Summary of PE Findings / Rec's - AF7019	14d	04-20-10	05-07-10	17d		TR2820	TR3360
Transit Station and Urban Design / Architecture (7.7)			285d	07-09-09	08-19-10	17d			
7.7.1 - LRT Station and Alignment Planning Analysis			40d	07-09-09	09-02-09	103d			
TR3000	5d/Wk ...	Review Plans/Regulations/Docs Affecting Stations	5d	07-09-09	07-15-09	28d		TR0010, TR0190, TR0180	TR3010
TR3010	5d/Wk ...	Inventory Adjacent Uses	5d	07-09-09	07-15-09	28d		TR3000	TR3070
Comparative Analysis of Station Area Dev. Potential Matrix			10d	07-16-09	07-29-09	33d			
TR3020	5d/Wk ...	Develop Design Goals w/ Public, Stakeholder Input	5d	07-16-09	07-22-09	28d		TR0220, TR0230, TR3070	TR3080, TR3130
TR3030	5d/Wk ...	Identify Bike / Ped. Access Routes to Stations	5d	07-16-09	07-22-09	38d		TR3070	TR3130
TR3040	5d/Wk ...	Assess Land Use and Access at Stations	5d	07-16-09	07-22-09	33d		TR3070	TR3110
TR3050	5d/Wk ...	Assessment of Station Location Based on Urban Character	5d	07-16-09	07-22-09	33d		TR3070	TR3110
TR3060	5d/Wk ...	Confirm Hayden Island TOD Analysis	5d	07-16-09	07-22-09	33d		TR3070	TR3110
TR3070	5d/Wk ...	Conceptual Analysis of Alignment Development Potential	10d	07-16-09	07-29-09	28d		TR3010	TR3020, TR3030, TR3040, TR3050, TR3060, TR3110
TR3080	5d/Wk ...	Prepare Summary of Community Interests	5d	07-23-09	07-29-09	28d		TR3020	TR3090, TR3130, TR3120
TR3090	5d/Wk ...	Create Station Area Themes	5d	07-23-09	07-29-09	28d		TR3080	TR3110, TR3130
Other			25d	07-30-09	09-02-09	103d			
TR3110	5d/Wk ...	Prepare Station Area TOD Capacity and Opportunity Study	5d	07-30-09	08-05-09	28d		TR3070, TR3040, TR3050, TR3060, TR3090	TR3130, TR3140
TR3120	5d/Wk ...	Prepare Implimentation Scope for Station Area Rec's - AF7032	20d	07-30-09	08-26-09	108d		TR3080	TR4880
TR3130	5d/Wk ...	Prepare Station Area Development Rec's / Locations	5d	08-06-09	08-12-09	28d		TR3020, TR3030, TR3080, TR3090, TR3110	TR3160, TR2360
TR3140	5d/Wk ...	Prepare List of Potential Resources for Stakeholders - AF7034	20d	08-06-09	09-02-09	103d		TR3110	TR4880
7.7.6 - Urban Design Guidelines			38d	08-13-09	10-06-09	28d			
TR3160	5d/Wk ...	Develop Urban Design Program Scope	19d	08-13-09	09-09-09	28d		TR3130	TR3170, TR2810
TR3170	5d/Wk ...	Develop Urban Design Base Program Req's	19d	09-10-09	10-06-09	28d		TR3160	TR3340, TR3420, TR3190, TR3230, TR3280
7.7.7 - Streetscape Preliminary Design			68d	10-07-09	01-13-10	171d			
TR3190	5d/Wk ...	Develop Streetscape Limits and Scope	10d	10-07-09	10-20-09	171d		TR3170	TR3200
TR3200	5d/Wk ...	Develop Base Program Req's	19d	10-21-09	11-16-09	171d		TR3190	TR3210
TR3210	5d/Wk ...	Prepare Typical Streetscape Plans and Sections	39d	11-17-09	01-13-10	171d		TR3200	TR4910
7.7.9 - Lighting Design			67d	10-07-09	01-12-10	172d			
TR3230	5d/Wk ...	Develop Lighting Limits and Scope	10d	10-07-09	10-20-09	172d		TR3170	TR3240
TR3240	5d/Wk ...	Develop Base Program Req's	19d	10-21-09	11-16-09	172d		TR3230	TR3250
TR3250	5d/Wk ...	Confirm Design Criteria for Light Levels and Public Areas	19d	11-17-09	12-14-09	172d		TR3240	TR3260
TR3260	5d/Wk ...	Develop Peliminary Lighting Plans	19d	12-15-09	01-12-10	172d		TR3250	TR4910
7.7.10 - Public Art Program			211d	10-07-09	08-04-10	28d			
TR3280	5d/Wk ...	Develop Art Program Scope	64d	10-07-09	01-07-10	28d		TR3170	TR3300
TR3290	5d/Wk ...	Convene Art Advisory Committee	42d	01-08-10	03-08-10	28d		TR3300	TR3310
TR3300	5d/Wk ...	Develop Base Art Program Req's	64d	01-08-10	04-07-10	28d		TR3280	TR3290
TR3310	5d/Wk ...	Art Program Session #1	0d		03-08-10	28d		TR3290	TR3320, TR3400
TR3320	5d/Wk ...	Identify Integrated Art Element Opportunities	105d	03-09-10	08-04-10	28d		TR3310	TR4910
7.7.2 - LRT Station Design			222d	10-07-09	08-19-10	17d			
TR3340	5d/Wk ...	Develop Station Design Base Program Req's	42d	10-07-09	12-04-09	61d		TR3170	TR3370, TR3360
TR3350	5d/Wk ...	Develop Connection Plan for Expo Station	42d	02-09-10	04-07-10	69d		TR4630, TR3360	TR3400
TR3360	5d/Wk ...	Develop Site Plan for Each Station	64d	02-09-10	05-07-10	17d		TR2830, TR2760, TR2770, TR3340	TR3350, TR3370, TR2380
TR3370	5d/Wk ...	Develop Typical Platform Plan and Elevation (w/Furnishings)	64d	03-23-10	06-21-10	17d		TR3360, TR3340	TR3390, TR3380
TR3380	5d/Wk ...	Develop Elevator Siting Req's	21d	06-22-10	07-21-10	38d		TR3370	TR3400
TR3390	5d/Wk ...	Develop Typical Sections for Station Types	42d	06-22-10	08-19-10	17d		TR3370	TR3400
TR3400	5d/Wk ...	Develop Platform Amenities Matrix of Station Furnishings	42d	06-22-10	08-19-10	17d		TR3380, TR3350, TR3310, TR3390	TR4910
7.7.3 - High Capacity Bus Stop / Transfer Area Design			48d	01-15-10	03-23-10	122d			
TR3420	5d/Wk ...	Develop HC Stop Base Program Req's	19d	01-15-10	02-10-10	122d		TR4630, TR3170	TR3430
TR3430	5d/Wk ...	Develop Site Plan for Each HC Bus Transfer Area	19d	02-11-10	03-09-10	122d		TR3420	TR3440
TR3440	5d/Wk ...	Develop HC Amenities Matrix of HC Stop Furnishings	10d	03-10-10	03-23-10	122d		TR3430	TR4910
7.7.8 - Develop Peliminary Landscape and Irrigation			58d	01-15-10	04-06-10	112d			
TR3460	5d/Wk ...	Develop Peliminary Landscape and Irrigation	58d	01-15-10	04-06-10	112d		TR4880	TR4910
Transit Systems Engineering (7.8)			287d	07-09-09	08-23-10	15d			
7.8.8 - LRT Central Control Interface w/ C-TRAN			264d	07-09-09	07-21-10	38d			
TR3500	5d/Wk ...	Develop Base Program Req's	64d	07-09-09	10-07-09	38d		TR0180	TR3520, TR4910
TR3520	5d/Wk ...	Develop Central Control Program Scope	64d	09-03-09	12-03-09	38d		TR3500	TR3540
TR3540	5d/Wk ...	Develop Conceptual Facility Expansion	100d	12-04-09	04-26-10	38d		TR3520	TR3560
TR3560	5d/Wk ...	Develop Conceptual Technology Migration and Upgrades	60d	04-27-10	07-21-10	38d		TR3540	TR4910
7.8.4 - LRT Communication System Design			270d	07-09-09	07-29-10	32d			

Columbia River CROSSING

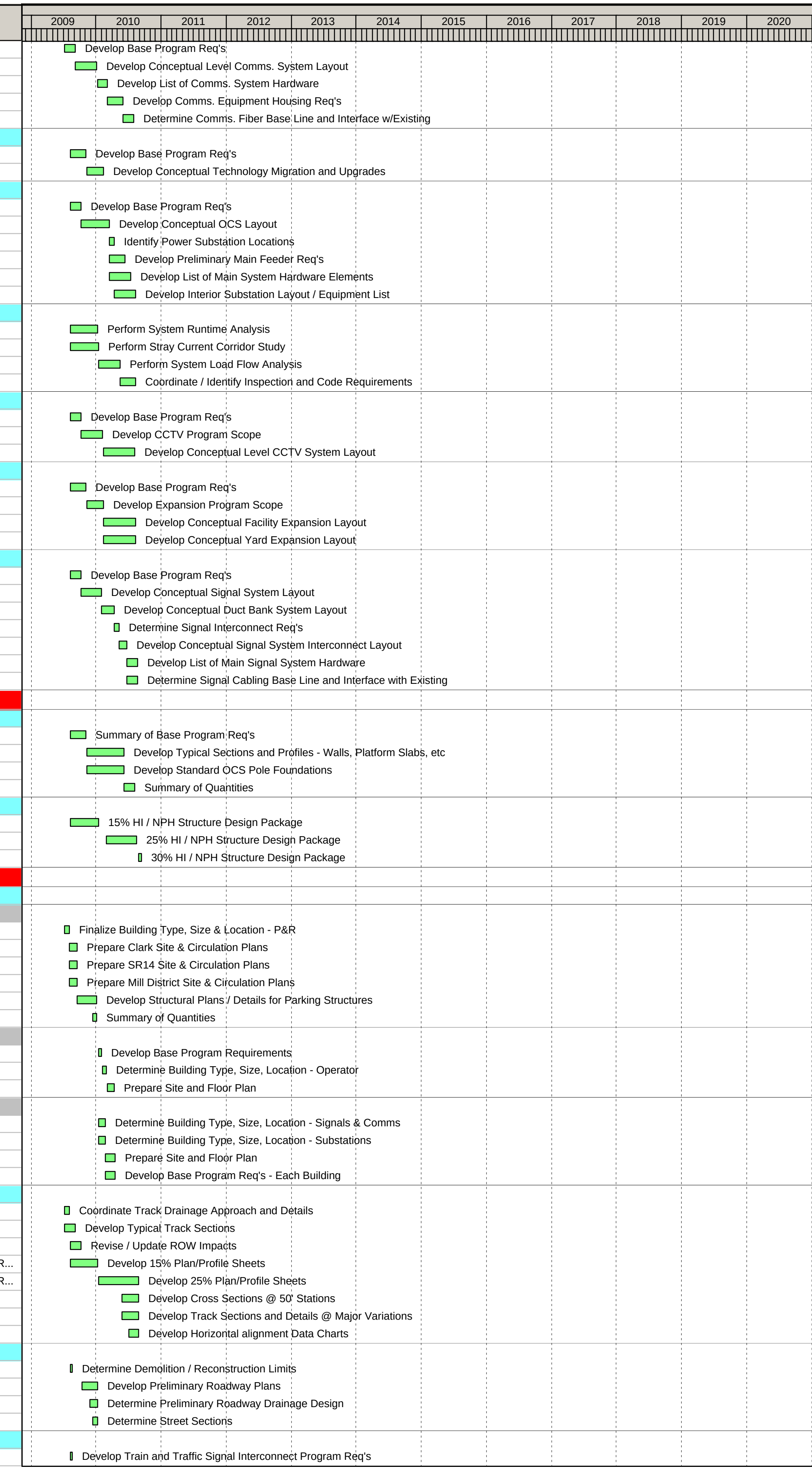
Remaining Work
Critical Remaining Work
Actual Work
Remaining Level of Effort
Milestone

Data Date: 09-01-08

Print Date/Time: 05-28-09 12:10

CRC Project Schedule (Baseline w/ current data through 4/22/09)

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
TR3580	5d/Wk ...	Develop Base Program Req's	42d	07-09-09	09-04-09	32d		TR0180	TR3600, TR4910
TR3600	5d/Wk ...	Develop Conceptual Level Comms. System Layout	84d	09-08-09	01-06-10	32d		TR3580	TR3610
TR3610	5d/Wk ...	Develop List of Comms. System Hardware	40d	01-07-10	03-03-10	32d		TR3600	TR3620
TR3620	5d/Wk ...	Develop Comms. Equipment Housing Req's	64d	03-04-10	06-02-10	32d		TR3610	TR3640
TR3640	5d/Wk ...	Determine Comms. Fiber Base Line and Interface w/Existing	40d	06-03-10	07-29-10	32d		TR3620	TR4910
7.8.6 - LRT Fare Collection and Transit Tracker			128d	08-10-09	02-09-10	152d			
TR3660	5d/Wk ...	Develop Base Program Req's	64d	08-10-09	11-06-09	152d		TR0180, TR4600	TR3680, TR4910
TR3680	5d/Wk ...	Develop Conceptual Technology Migration and Upgrades	64d	11-09-09	02-09-10	152d		TR3660	TR4910
7.8.2 - LRT Traction Electrification System			258d	08-10-09	08-12-10	22d			
TR3700	5d/Wk ...	Develop Base Program Req's	42d	08-10-09	10-07-09	22d		TR0180, TR4600	TR3720, TR4910
TR3720	5d/Wk ...	Develop Conceptual OCS Layout	110d	10-08-09	03-15-10	22d		TR3700, TR4600	TR3740, TR3780, TR3760, TR4910
TR3740	5d/Wk ...	Identify Power Substation Locations	21d	03-16-10	04-13-10	22d		TR3720	TR3800
TR3760	5d/Wk ...	Develop Preliminary Main Feeder Req's	64d	03-16-10	06-14-10	25d		TR3720	TR2390
TR3780	5d/Wk ...	Develop List of Main System Hardware Elements	85d	03-16-10	07-14-10	43d		TR3720	TR4910
TR3800	5d/Wk ...	Develop Interior Substation Layout / Equipment List	85d	04-14-10	08-12-10	22d		TR3740	TR4910
7.8.1 - LRT Transit Systems Studies			259d	08-10-09	08-13-10	21d			
TR3820	5d/Wk ...	Perform System Runtime Analysis	106d	08-10-09	01-08-10	25d		TR0180, TR4600	TR3860
TR3840	5d/Wk ...	Perform Stray Current Corridor Study	110d	08-10-09	01-14-10	21d		TR0180, TR4600	TR3860
TR3860	5d/Wk ...	Perform System Load Flow Analysis	85d	01-15-10	05-13-10	21d		TR3820, TR3840	TR3880
TR3880	5d/Wk ...	Coordinate / Identify Inspection and Code Requirements	64d	05-14-10	08-13-10	21d		TR3860	TR4910
7.8.5 - LRT CCTV System Design			254d	08-10-09	08-06-10	26d			
TR3900	5d/Wk ...	Develop Base Program Req's	42d	08-10-09	10-07-09	26d		TR0180, TR4600	TR3920, TR4910
TR3920	5d/Wk ...	Develop CCTV Program Scope	85d	10-08-09	02-08-10	26d		TR3900	TR3940
TR3940	5d/Wk ...	Develop Conceptual Level CCTV System Layout	127d	02-09-10	08-06-10	26d		TR3920	TR4910
7.8.7 - Existing Maintenance Facility and Yard Expansion			255d	08-10-09	08-09-10	25d			
TR3960	5d/Wk ...	Develop Base Program Req's	64d	08-10-09	11-06-09	25d		TR0180, TR4600	TR3980, TR4910
TR3980	5d/Wk ...	Develop Expansion Program Scope	64d	11-09-09	02-09-10	25d		TR3960	TR4000, TR4020
TR4000	5d/Wk ...	Develop Conceptual Facility Expansion Layout	127d	02-10-10	08-09-10	25d		TR3980	TR4910
TR4020	5d/Wk ...	Develop Conceptual Yard Expansion Layout	127d	02-10-10	08-09-10	25d		TR3980	TR4910
7.8.3 - LRT Signal System Design			265d	08-10-09	08-23-10	15d			
TR4040	5d/Wk ...	Develop Base Program Req's	42d	08-10-09	10-07-09	15d		TR0180, TR4600	TR4060, TR4910
TR4060	5d/Wk ...	Develop Conceptual Signal System Layout	80d	10-08-09	02-01-10	15d		TR4040, TR4600	TR4080, TR4910
TR4080	5d/Wk ...	Develop Conceptual Duct Bank System Layout	50d	02-02-10	04-12-10	15d		TR4060	TR4100
TR4100	5d/Wk ...	Determine Signal Interconnect Req's	21d	04-13-10	05-11-10	15d		TR4080	TR4120
TR4120	5d/Wk ...	Develop Conceptual Signal System Interconnect Layout	30d	05-12-10	06-23-10	15d		TR4100	TR4140, TR4160
TR4140	5d/Wk ...	Develop List of Main Signal System Hardware	42d	06-24-10	08-23-10	15d		TR4120	TR4910
TR4160	5d/Wk ...	Determine Signal Cabling Base Line and Interface with Existing	42d	06-24-10	08-23-10	15d		TR4120	TR4910
Transit Structural Design (7.9)			279d	08-10-09	09-13-10	41d			
Transit Struct Design - Project			254d	08-10-09	08-06-10	26d			
TR4200	5d/Wk ...	Summary of Base Program Req's	64d	08-10-09	11-06-09	26d		TR4600	TR4220, TR4240, TR4910
TR4220	5d/Wk ...	Develop Typical Sections and Profiles - Walls, Platform Slabs, etc	148d	11-09-09	06-08-10	26d		TR4200	TR4260
TR4240	5d/Wk ...	Develop Standard OCS Pole Foundations	148d	11-09-09	06-08-10	26d		TR4200	TR4260
TR4260	5d/Wk ...	Summary of Quantities	42d	06-09-10	08-06-10	26d		TR4220, TR4240	TR4910
Hayden Island / North Portland Harbor Structures			279d	08-10-09	09-13-10	41d			
TR4300	5d/Wk ...	15% HI / NPH Structure Design Package	110d	08-10-09	01-14-10	11d		TR4600	TR4880
TR4330	5d/Wk ...	25% HI / NPH Structure Design Package	120d	02-26-10	08-16-10	20d		TR4890	TR4910
TR4360	5d/Wk ...	30% HI / NPH Structure Design Package	10d	08-30-10	09-13-10	41d		TR4910	TR5000
Transit Preliminary Civil Engineering (7.6)			468d	07-09-09	05-09-11	0d			
7.6.3 - Civil Engineering for LRT			200d	07-09-09	04-20-10	102d			
P&R Site, Circulation & Structural Plans			125d	07-09-09	01-05-10	177d			
TR4400	5d/Wk ...	Finalize Building Type, Size & Location - P&R	20d	07-09-09	08-05-09	177d		TR1630, TR0180	TR4410, TR4420, TR4430
TR4410	5d/Wk ...	Prepare Clark Site & Circulation Plans	30d	08-06-09	09-17-09	177d		TR0180, TR1630, TR4400	TR4440
TR4420	5d/Wk ...	Prepare SR14 Site & Circulation Plans	30d	08-06-09	09-17-09	177d		TR0180, TR1630, TR4400	TR4440
TR4430	5d/Wk ...	Prepare Mill District Site & Circulation Plans	30d	08-06-09	09-17-09	177d		TR0180, TR1630, TR4400	TR4440
TR4440	5d/Wk ...	Develop Structural Plans / Details for Parking Structures	75d	09-18-09	01-05-10	177d		TR4410, TR4420, TR4430	TR4460, TR4910
TR4460	5d/Wk ...	Summary of Quantities	15d	12-14-09	01-05-10	177d		TR4440	TR4910
Operator / Security Building			62d	01-15-10	04-12-10	108d			
TR4480	5d/Wk ...	Develop Base Program Requirements	14d	01-15-10	02-03-10	108d		TR4880	TR4490
TR4490	5d/Wk ...	Determine Building Type, Size, Location - Operator	19d	02-04-10	03-02-10	108d		TR4480	TR4500
TR4500	5d/Wk ...	Prepare Site and Floor Plan	29d	03-03-10	04-12-10	108d		TR4490	TR4910
Systems Building			68d	01-15-10	04-20-10	102d			
TR4520	5d/Wk ...	Determine Building Type, Size, Location - Signals & Comms	29d	01-15-10	02-24-10	102d		TR4880	TR4540, TR4550
TR4530	5d/Wk ...	Determine Building Type, Size, Location - Substations	29d	01-15-10	02-24-10	102d		TR4880	TR4540, TR4550
TR4540	5d/Wk ...	Prepare Site and Floor Plan	39d	02-25-10	04-20-10	102d		TR4520, TR4530	TR4910
TR4550	5d/Wk ...	Develop Base Program Req's - Each Building	39d	02-25-10	04-20-10	102d		TR4520, TR4530	TR4910
7.6.2 - Track Alignment and Details			291d	07-09-09	08-27-10	11d			
TR4570	5d/Wk ...	Coordinate Track Drainage Approach and Details	19d	07-09-09	08-04-09	124d		TR0180	TR4750, TR4880
TR4580	5d/Wk ...	Develop Typical Track Sections	42d	07-09-09	09-04-09	101d		TR0180	TR4880
TR4590	5d/Wk ...	Revise / Update ROW Impacts	42d	08-10-09	10-07-09	79d		TR4720, TR0180	TR4880
TR4600	5d/Wk ...	Develop 15% Plan/Profile Sheets	106d	08-10-09	01-08-10	11d		TR1530, TR1540, TR0180, TR1600, TR1820, TR0620	TR2300, TR4880, TR4720, TR4760, TR4780, TR4790, TR3840, TR3820, TR...
TR4630	5d/Wk ...	Develop 25% Plan/Profile Sheets	159d	01-15-10	08-27-10	11d		TR1530, TR1560, TR0180, TR4880	TR4660, TR4680, TR4700, TR3350, TR3420, TR2780, TR2260, TR2340, TR...
TR4660	5d/Wk ...	Develop Cross Sections @ 50' Stations	65d	05-27-10	08-27-10	11d		TR4630	TR4910
TR4680	5d/Wk ...	Develop Track Sections and Details @ Major Variations	65d	05-27-10	08-27-10	11d		TR4630	TR4910
TR4700	5d/Wk ...	Develop Horizontal alignment Data Charts	39d	07-06-10	08-27-10	11d		TR4630	TR4910
7.6.4 - Roadway Civil for LRT			106d	08-10-09	01-08-10	174d			
TR4720	5d/Wk ...	Determine Demolition / Reconstruction Limits	10d	08-10-09	08-21-09	79d		TR4600	TR4590, TR4910
TR4730	5d/Wk ...	Develop Preliminary Roadway Plans	58d	10-16-09	01-08-10	174d		TR4750	TR4810, TR4820, TR4910
TR4750	5d/Wk ...	Determine Preliminary Roadway Drainage Design	29d	11-27-09	01-08-10	174d		TR4570, TR4760	TR4730
TR4760	5d/Wk ...	Determine Street Sections	19d	12-11-09	01-08-10	174d		TR4600	TR4750
7.6.6 - Traffic Engineering and Inter. Design wrt LRT			106d	08-10-09	01-08-10	194d			
TR4780	5d/Wk ...	Develop Train and Traffic Signal Interconnect Program Req's	10d	08-10-09	08-21-09	251d		TR4600	TR4810, TR4910



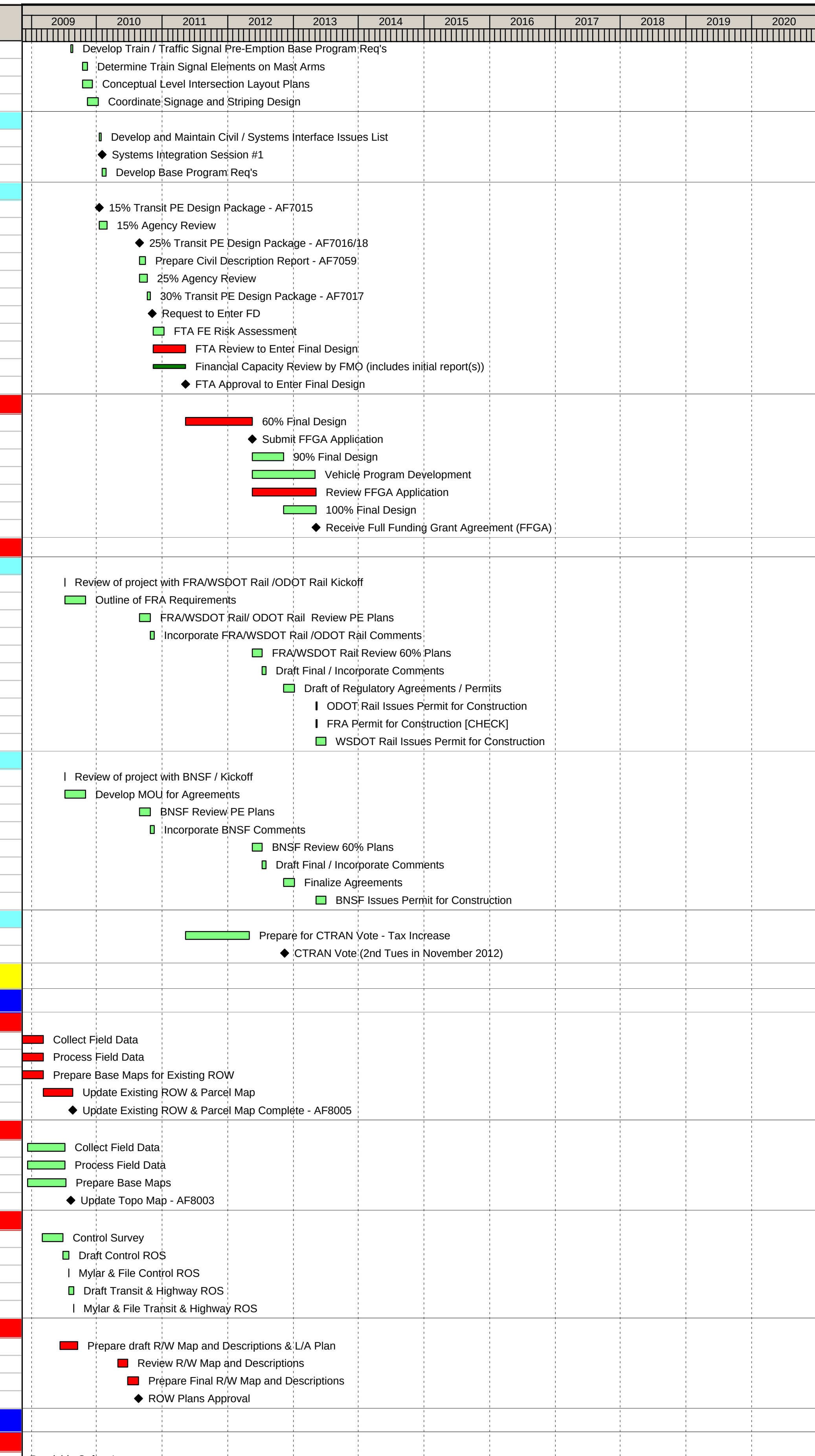
Remaining Work
Critical Remaining Work
Actual Work
Remaining Level of Effort
Milestone

Data Date: 09-01-08

Print Date/Time: 05-28-09 12:10

CRC Project Schedule (Baseline w/ current data through 4/22/09)

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
TR4790	5d/Wk ...	Develop Train / Traffic Signal Pre-Emption Base Program Req's	10d	08-10-09	08-21-09	251d		TR4600	TR4810, TR4910
TR4800	5d/Wk ...	Determine Train Signal Elements on Mast Arms	19d	10-16-09	11-11-09	213d		TR4810	TR4910
TR4810	5d/Wk ...	Conceptual Level Intersection Layout Plans	39d	10-16-09	12-10-09	213d		TR4730, TR4780, TR4790	TR4800
TR4820	5d/Wk ...	Coordinate Signage and Striping Design	39d	11-12-09	01-08-10	174d		TR4730	TR4910
7.6.5 - Civil / Systems Coordination			29d	01-15-10	02-24-10	141d			
TR4840	5d/Wk ...	Develop and Maintain Civil / Systems Interface Issues List	10d	01-15-10	01-28-10	141d		TR4880	TR4850, TR4860
TR4850	5d/Wk ...	Systems Integration Session #1	0d	01-29-10		141d		TR4840	TR4860
TR4860	5d/Wk ...	Develop Base Program Req's	19d	01-29-10	02-24-10	141d		TR4840, TR4850	TR4910
Transit PE Design Process			336d	01-14-10	05-09-11	0d			
TR4880	5d/Wk ...	15% Transit PE Design Package - AF7015	0d		01-14-10	11d		TR4600, TR4580, TR4570, TR4590, TR3120, TR3140, TR4300	TR4890, TR4630, TR4480, TR4520, TR4530, TR4840, EN4900, TR3460
TR4890	5d/Wk ...	15% Agency Review	30d	01-15-10	02-25-10	20d		TR4880	TR4910, TR4330
TR4910	5d/Wk ...	25% Transit PE Design Package - AF7016/18	0d		08-27-10	11d		TR4890, TR4660, TR4680, TR4700, TR4500, TR4540, TR4550, TR4730, T...	TR4930, TR4360, TR4920
TR4920	5d/Wk ...	Prepare Civil Description Report - AF7059	20d	08-30-10	09-27-10	21d		TR4910	TR4950
TR4930	5d/Wk ...	25% Agency Review	30d	08-30-10	10-11-10	11d		TR4910	TR4950
TR4950	5d/Wk ...	30% Transit PE Design Package - AF7017	10d	10-12-10	10-25-10	11d		TR4930, TR4920	TR5000
TR5000	5d/Wk ...	Request to Enter FD	0d		11-09-10	0d		TR4950, TR2070, EN4900, TR4360, IA2860, FN1570	TR5050, TR5020
TR5020	5d/Wk ...	FTA FE Risk Assessment	42d	11-10-10	01-11-11	84d		TR5000	TR5200
TR5050	5d/Wk ...	FTA Review to Enter Final Design	126d	11-10-10	05-09-11	0d		TR5000, FN3500	TR5200, TR5100, TR5100
TR5100	5d/Wk ...	Financial Capacity Review by FMO (includes initial report(s))	126d	11-10-10	05-09-11	0d		TR5050, TR5050	TR5200
TR5200	5d/Wk ...	FTA Approval to Enter Final Design	0d		05-09-11	0d		TR5050, TR5020, TR5100	TR5220, TR6500
Final Design			508d	05-10-11	05-06-13	313d			
TR5220	5d/Wk ...	60% Final Design	260d	05-10-11	05-15-12	0d		TR5200	TR5320, TR5950, TR5750, TR5380, TR5300
TR5300	5d/Wk ...	Submit FFGA Application	0d	05-16-12		0d		TR5220, TR2150	TR5440
TR5320	5d/Wk ...	90% Final Design	124d	05-16-12	11-08-12	313d		TR5220	TR5500, TR5970, TR5770
TR5380	5d/Wk ...	Vehicle Program Development	246d	05-16-12	05-02-13	142d		TR5220	AA2120
TR5440	5d/Wk ...	Review FFGA Application	248d	05-16-12	05-06-13	0d		TR5300	TR5600
TR5500	5d/Wk ...	100% Final Design	124d	11-09-12	05-06-13	313d		TR5320	TR8400, TR5990, TR5800, TR5780, TR5790, AA2220, AA2420
TR5600	5d/Wk ...	Receive Full Funding Grant Agreement (FFGA)	0d		05-06-13*	0d	05-06-13	TR2040, TR6520, TR5440, RW2530, TR2190	AA2220, AA2420, RW2600, AA2720, AA2120, AA2920, AA2820, AA2620
Coordination for Permit & Zoning Constraints (7.14)			101...	07-09-09	07-02-13	739d			
7.14.2 - FRA/WSDOT Rail/ODOT Rail Permitting			101...	07-09-09	07-02-13	739d			
TR5700	5d/Wk ...	Review of project with FRA/WSDOT Rail /ODOT Rail Kickoff	1d	07-09-09	07-09-09	1258d		TR0180	TR5710
TR5710	5d/Wk ...	Outline of FRA Requirements	80d	07-10-09	10-30-09	1258d		TR5700	TR5730
TR5730	5d/Wk ...	FRA/WSDOT Rail/ ODOT Rail Review PE Plans	40d	08-30-10	10-25-10	1048d		TR5710, TR4630	TR5740
TR5740	5d/Wk ...	Incorporate FRA/WSDOT Rail /ODOT Rail Comments	15d	10-26-10	11-15-10	1048d		TR5730	TR5750
TR5750	5d/Wk ...	FRA/WSDOT Rail Review 60% Plans	40d	05-16-12	07-12-12	666d		TR5740, TR5220	TR5760
TR5760	5d/Wk ...	Draft Final / Incorporate Comments	15d	07-13-12	08-02-12	666d		TR5750	TR5770
TR5770	5d/Wk ...	Draft of Regulatory Agreements / Permits	40d	11-09-12	01-08-13	597d		TR5760, TR5320	TR5800, TR5780, TR5790
TR5780	5d/Wk ...	ODOT Rail Issues Permit for Construction	5d	05-07-13	05-13-13	774d		TR5500, TR5770	TR8200
TR5790	5d/Wk ...	FRA Permit for Construction [CHECK]	5d	05-07-13	05-13-13	548d		TR5770, TR5500	TR7800, TR7800
TR5800	5d/Wk ...	WSDOT Rail Issues Permit for Construction	40d	05-07-13	07-02-13	513d		TR5770, TR5500	TR7800
7.14.1 - BNSF Permitting			101...	07-09-09	07-02-13	513d			
TR5900	5d/Wk ...	Review of project with BNSF / Kickoff	1d	07-09-09	07-09-09	1258d		TR0180	TR5910
TR5910	5d/Wk ...	Develop MOU for Agreements	80d	07-10-09	10-30-09	1258d		TR5900	TR5930
TR5930	5d/Wk ...	BNSF Review PE Plans	40d	08-30-10	10-25-10	1048d		TR5910, TR4630	TR5940
TR5940	5d/Wk ...	Incorporate BNSF Comments	15d	10-26-10	11-15-10	1048d		TR5930	TR5950
TR5950	5d/Wk ...	BNSF Review 60% Plans	40d	05-16-12	07-12-12	666d		TR5940, TR5220	TR5960
TR5960	5d/Wk ...	Draft Final / Incorporate Comments	15d	07-13-12	08-02-12	666d		TR5950	TR5970
TR5970	5d/Wk ...	Finalize Agreements	40d	11-09-12	01-08-13	597d		TR5960, TR5320	TR5990
TR5990	5d/Wk ...	BNSF Issues Permit for Construction	40d	05-07-13	07-02-13	513d		TR5970, TR5500	TR7800
CTRAN Vote - Tax Increase			387d	05-10-11	11-13-12	121d			
TR6500	5d/Wk ...	Prepare for CTRAN Vote - Tax Increase	250d	05-10-11	05-01-12	258d		TR5200	TR6520
TR6520	5d/Wk ...	CTRAN Vote (2nd Tues in November 2012)	0d		11-13-12*	121d	11-13-12	TR6500	TR5600
HIGHWAY PLANNING & ENGINEERING			154...	09-02-08	09-25-14	349d			
ROW Engineering			503d	09-02-08	08-20-10	0d			
Cadastral Survey			249d	09-02-08	08-21-09	0d			
RE1010	5d/Wk ...	Collect Field Data	132d	09-02-08	03-09-09	0d		PM1010	RE1020
RE1020	5d/Wk ...	Process Field Data	132d	09-03-08	03-10-09	0d		RE1010	RE1030
RE1030	5d/Wk ...	Prepare Base Maps for Existing ROW	132d	09-04-08	03-11-09	0d		RE1020	RE1040, RE1240
RE1040	5d/Wk ...	Update Existing ROW & Parcel Map	115d	03-12-09	08-21-09	0d		RE1030	RE1050
RE1050	5d/Wk ...	Update Existing ROW & Parcel Map Complete - AF8005	0d		08-21-09	0d		RE1040	RE1310
Topo			169d	12-10-08	08-07-09	247d			
RE1110	5d/Wk ...	Collect Field Data	148d	12-10-08	07-09-09	247d		PM1010	RE1120
RE1120	5d/Wk ...	Process Field Data	148d	12-11-08	07-10-09	247d		RE1110	RE1130
RE1130	5d/Wk ...	Prepare Base Maps	148d	12-12-08	07-13-09	247d		RE1120	RE1140
RE1140	5d/Wk ...	Update Topo Map - AF8003	0d		08-07-09	247d		RE1130	AL1420
Record of Survey (ROS)			126d	03-02-09	08-26-09	171d			
RE1210	5d/Wk ...	Control Survey	84d	03-02-09	06-26-09	171d		PM1010	RE1220
RE1220	5d/Wk ...	Draft Control ROS	20d	06-29-09	07-27-09	171d		RE1210	RE1230
RE1230	5d/Wk ...	Mylar & File Control ROS	1d	07-28-09	07-28-09	171d		RE1220	RE1240
RE1240	5d/Wk ...	Draft Transit & Highway ROS	20d	07-29-09	08-25-09	171d		RE1230, RE1030, TR1530	RE1250
RE1250	5d/Wk ...	Mylar & File Transit & Highway ROS	1d	08-26-09	08-26-09	171d		RE1240	RE1330
ROW Plans			307d	06-09-09	08-20-10	0d			
RE1310	5d/Wk ...	Prepare draft R/W Map and Descriptions & L/A Plan	68d	06-09-09	09-14-09	0d		AL1150, RE1050	RE1330, AM1800
RE1330	5d/Wk ...	Review R/W Map and Descriptions	40d	04-29-10	06-24-10	0d		RE1310, RE1250, AM1920	RE1340
RE1340	5d/Wk ...	Prepare Final R/W Map and Descriptions	40d	06-25-10	08-20-10	0d		RE1330	RE1350
RE1350	5d/Wk ...	ROW Plans Approval	0d		08-20-10	0d		RE1340, AM1930	RW1300
Alignments			395d	09-02-08	03-19-10	106d			
Initial Concept			160d	09-02-08	04-16-09	16d			
AL1110	5d/Wk ...	Roadside Safety Inventory	40d	09-02-08	10-27-08	63d		PM1010	AL1150

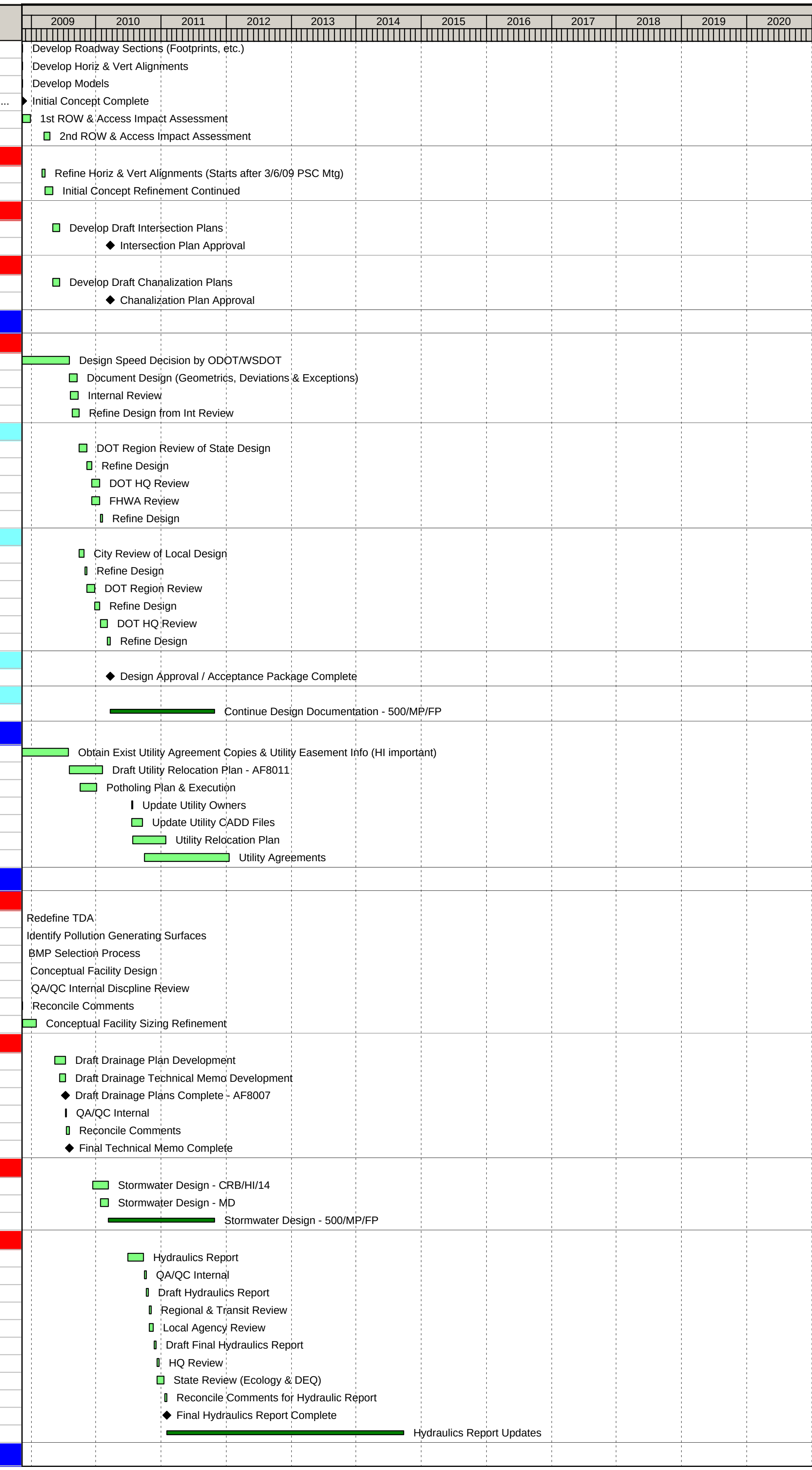


Remaining Work | Critical Remaining Work | Actual Work
Remaining Level of Effort | Milestone

Data Date: 09-01-08
Print Date/Time: 05-28-09 12:10

CRC Project Schedule (Baseline w/ current data through 4/22/09)

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
AL1120	5d/Wk ...	Develop Roadway Sections (Footprints, etc.)	54d	09-02-08	11-14-08	49d		PM1010	AL1150
AL1130	5d/Wk ...	Develop Horiz & Vert Alignments	54d	09-02-08	11-14-08	32d		PM1010	AL1150, ST0130
AL1140	5d/Wk ...	Develop Models	54d	09-02-08	11-14-08	49d		PM1010	AL1150
AL1150	5d/Wk ...	Initial Concept Complete	0d		11-14-08	49d		AL1120, AL1130, AL1140, AL1110	PM1110, AL1310, AL1410, RE1310, DD1140, TC1110, TD1110, RD1110, R...
AL1160	5d/Wk ...	1st ROW & Access Impact Assessment	29d	11-17-08	12-29-08	68d		AL1150	EN0190, AL1170
AL1170	5d/Wk ...	2nd ROW & Access Impact Assessment	25d	03-13-09	04-16-09	16d		AL1160, KD1110, KD1120, KD1130	EN0200
Initial Concept Refinement			40d	03-06-09	04-30-09	331d			
AL1210	5d/Wk ...	Refine Horiz & Vert Alignments (Starts after 3/6/09 PSC Mtg)	10d	03-06-09	03-19-09	111d		AL1150	DS1100, AL1220, RD1140
AL1220	5d/Wk ...	Initial Concept Refinement Continued	30d	03-20-09	04-30-09	331d		AL1210	DS1100, DS5100
Intersection Plan			225d	05-01-09	03-19-10	106d			
AL1310	5d/Wk ...	Develop Draft Intersection Plans	30d	05-01-09	06-12-09	141d		AL1150	DD1140
AL1320	5d/Wk ...	Intersection Plan Approval	0d		03-19-10	106d		DD1360, DD1250, TD1110, TD1120	DD1600
Chanalization Plan			225d	05-01-09	03-19-10	106d			
AL1410	5d/Wk ...	Develop Draft Chanalization Plans	30d	05-01-09	06-12-09	141d		AL1150	DD1140, TD1110, TD1120
AL1420	5d/Wk ...	Chanalization Plan Approval	0d		03-19-10	106d		RE1140, DD1360, DD1250	DD1600
Design Documentation			806d	09-02-08	10-28-11	25d			
Design Approval/Acceptance Process (DAP)			806d	09-02-08	10-28-11	25d			
DD1110	5d/Wk ...	Design Speed Decision by ODOT/WSDOT	235d	09-02-08	08-03-09	106d		PM1010	DD1140
DD1140	5d/Wk ...	Document Design (Geometrics, Deviations & Exceptions)	30d	08-04-09	09-15-09	106d		AL1150, AL1310, AL1410, DD1110, KD1150, KD1160	DD1150
DD1150	5d/Wk ...	Internal Review	30d	08-11-09	09-22-09	106d		DD1140	DD1160
DD1160	5d/Wk ...	Refine Design from Int Review	30d	08-18-09	09-29-09	106d		DD1150	DD1310, DD1210
Review of State Design			90d	09-30-09	02-05-10	136d			
DD1210	5d/Wk ...	DOT Region Review of State Design	30d	09-30-09	11-10-09	136d		DD1160	DD1220
DD1220	5d/Wk ...	Refine Design	20d	11-11-09	12-09-09	136d		DD1210	DD1230, DD1240
DD1230	5d/Wk ...	DOT HQ Review	30d	12-10-09	01-22-10	136d		DD1220	DD1250
DD1240	5d/Wk ...	FHWA Review	30d	12-10-09	01-22-10	136d		DD1220	DD1250
DD1250	5d/Wk ...	Refine Design	10d	01-25-10	02-05-10	136d		DD1230, DD1240	DD1600, AL1320, AL1420
Review of City Design			120d	09-30-09	03-19-10	106d			
DD1310	5d/Wk ...	City Review of Local Design	20d	09-30-09	10-27-09	106d		DD1160	DD1320, DD1320
DD1320	5d/Wk ...	Refine Design	10d	10-28-09	11-10-09	106d		DD1310, DD1310	DD1330
DD1330	5d/Wk ...	DOT Region Review	30d	11-11-09	12-23-09	106d		DD1320	DD1340
DD1340	5d/Wk ...	Refine Design	20d	12-24-09	01-22-10	106d		DD1330	DD1350
DD1350	5d/Wk ...	DOT HQ Review	30d	01-25-10	03-05-10	106d		DD1340	DD1360
DD1360	5d/Wk ...	Refine Design	10d	03-08-10	03-19-10	106d		DD1350	AL1320, AL1420
Design Approval / Acceptance Completion			0d	03-19-10	03-19-10	106d			
DD1600	5d/Wk ...	Design Approval / Acceptance Package Complete	0d		03-19-10	106d		AL1320, AL1420, DD1250, AM1050	DS1100, DS5100, DD1800
Design Documentation Package			411d	03-22-10	10-28-11	25d			
DD1800	5d/Wk ...	Continue Design Documentation - 500/MP/FP	411d	03-22-10	10-28-11	25d		DD1600	DS6100
Utilities			863d	09-02-08	01-20-12	84d			
UT1100	5d/Wk ...	Obtain Exist Utility Agreement Copies & Utility Easement Info (HI important)	234d	09-02-08	07-31-09	228d		PM1010	UT1300
UT1300	5d/Wk ...	Draft Utility Relocation Plan - AF8011	130d	08-03-09	02-04-10	228d		KD1120, TR0610, UT1100, KD1130	UT1500
UT1500	5d/Wk ...	Potholing Plan & Execution	65d	10-01-09	01-04-10	228d		UT1300	UT1600
UT1550	5d/Wk ...	Update Utility Owners	5d	07-21-10	07-27-10	84d		EN4900, EN4500	UT1700
UT1600	5d/Wk ...	Update Utility CADD Files	42d	07-21-10	09-17-10	89d		EN4900, UT1500	UT1700
UT1700	5d/Wk ...	Utility Relocation Plan	126d	07-28-10	01-25-11	84d		UT1600, UT1550	UT2000
UT2000	5d/Wk ...	Utility Agreements	336d	09-27-10	01-20-12	84d		UT1700	AA1110, AA1610, AA1510, AA1710, AA1410
Stormwater / Hydraulics			152...	09-29-08	09-25-14	349d			
Stormwater - Conceptual Design Development			85d	09-29-08	01-28-09	80d			
SW1010	5d/Wk ...	Redefine TDA	10d	09-29-08	10-10-08	80d		PM1010	SW1020
SW1020	5d/Wk ...	Identify Pollution Generating Surfaces	5d	10-06-08	10-10-08	80d		SW1010	SW1030
SW1030	5d/Wk ...	BMP Selection Process	7d	10-13-08	10-21-08	80d		SW1020	SW1040
SW1040	5d/Wk ...	Conceptual Facility Design	10d	10-22-08	11-04-08	80d		SW1030	SW1050
SW1050	5d/Wk ...	QA/QC Internal Discpline Review	5d	11-05-08	11-11-08	80d		SW1040	SW1060
SW1060	5d/Wk ...	Reconcile Comments	3d	11-12-08	11-14-08	80d		SW1050	EN0150
SW1070	5d/Wk ...	Conceptual Facility Sizing Refinement	50d	11-17-08	01-28-09	80d		EN0150	SW1110
Stormwater - Reporting for FEIS			57d	05-13-09	08-03-09	6d			
SW1110	5d/Wk ...	Draft Drainage Plan Development	42d	05-13-09	07-13-09	6d		SW1070, KD1110, KD1140, KD1120, KD1130	SW1130, SW1120
SW1120	5d/Wk ...	Draft Drainage Technical Memo Development	21d	06-12-09	07-13-09	6d		SW1110	SW1140
SW1130	5d/Wk ...	Draft Drainage Plans Complete - AF8007	0d		07-13-09	6d		SW1110	SW1140
SW1140	5d/Wk ...	QA/QC Internal	5d	07-14-09	07-20-09	6d		SW1130, SW1120	SW1150
SW1150	5d/Wk ...	Reconcile Comments	10d	07-21-09	08-03-09	6d		SW1140	SW1160
SW1160	5d/Wk ...	Final Technical Memo Complete	0d		08-03-09	6d		SW1150	EN4220, EN3300, SW1200, SW1500
Stormwater - Design			479d	12-14-09	10-28-11	25d			
SW1200	5d/Wk ...	Stormwater Design - CRB/HI/14	60d	12-14-09	03-09-10	114d		SW1160, TR2300, RD1200	SW1800, SW2100, DS1100
SW1500	5d/Wk ...	Stormwater Design - MD	30d	01-27-10	03-09-10	296d		SW1160, RD1500, TR2300	SW1800, SW2100, DS5100
SW1800	5d/Wk ...	Stormwater Design - 500/MP/FP	419d	03-10-10	10-28-11	25d		SW1200, SW1500	DS6100
Stormwater - Hydraulics Report			108...	06-28-10	09-25-14	349d			
SW2100	5d/Wk ...	Hydraulics Report	63d	06-28-10	09-24-10	486d		SW1200, DS1100, TR2300, GT1320, SW1500	SW2200
SW2200	5d/Wk ...	QA/QC Internal	10d	09-27-10	10-08-10	486d		SW2100	SW2210
SW2210	5d/Wk ...	Draft Hydraulics Report	10d	10-11-10	10-22-10	486d		SW2200	SW2220, SW2230
SW2220	5d/Wk ...	Regional & Transit Review	10d	10-25-10	11-05-10	496d		SW2210	SW2240
SW2230	5d/Wk ...	Local Agency Review	20d	10-25-10	11-19-10	486d		SW2210	SW2240
SW2240	5d/Wk ...	Draft Final Hydraulics Report	10d	11-22-10	12-06-10	486d		SW2220, SW2230	SW2250, SW2260
SW2250	5d/Wk ...	HQ Review	10d	12-07-10	12-20-10	506d		SW2240	SW2270
SW2260	5d/Wk ...	State Review (Ecology & DEQ)	30d	12-07-10	01-19-11	486d		SW2240	SW2270
SW2270	5d/Wk ...	Reconcile Comments for Hydraulic Report	10d	01-20-11	02-02-11	486d		SW2250, SW2260	SW2280
SW2280	5d/Wk ...	Final Hydraulics Report Complete	0d		02-02-11	486d		SW2270	SW2300, DS6410
SW2300	5d/Wk ...	Hydraulics Report Updates	930d	02-03-11	09-25-14	349d		SW2280	AA1120, AA1620, AA1520, AA1720, AA1420, AA2220, AA2420
Staging & Traffic Control			752d	11-17-08	10-28-11	25d			



Columbia River CROSSING

Remaining Work — Critical Remaining Work — Actual Work — Remaining Level of Effort — ◆ Milestone

Data Date: 09-01-08

Print Date/Time: 05-28-09 12:10

CRC Project Schedule (Baseline w/ current data through 4/22/09)

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
TC1110	5d/Wk ...	Develop Alignments	64d	11-17-08	02-17-09	293d		AL1150	TC1120, TC1140
TC1120	5d/Wk ...	Develop Cross Sections	64d	12-02-08	03-03-09	293d		TC1110	TC1130, TC1140
TC1130	5d/Wk ...	Develop Models	64d	12-16-08	03-17-09	293d		TC1120	TC1140
TC1140	5d/Wk ...	Prepare Quantities	10d	03-18-09	03-31-09	293d		TC1110, TC1120, TC1130	TC1200, DS6100
TC1200	5d/Wk ...	Continue Staging & Traffic Control Design - CRB/HI/14	60d	10-01-09	12-24-09	165d		TC1140, RD1200	DS1100, TC1500
TC1500	5d/Wk ...	Continue Staging & Traffic Control Design - MD	40d	12-28-09	02-22-10	307d		RD1500, TC1200	DS5100, TC1800
TC1800	5d/Wk ...	Continue Staging & Traffic Control Design - 500/MP/FP	430d	02-23-10	10-28-11	25d		TC1500	DS6100
Roadside			715d	01-12-09	10-28-11	25d			
Roadside Development & Env Mitigation Plans			715d	01-12-09	10-28-11	25d			
RD1110	5d/Wk ...	Conceptual Roadside Development Plan	60d	01-12-09	04-03-09	75d		AL1150	PS6160, RD1140, EN3900, EN0290
RD1140	5d/Wk ...	Dev Draft Mitigation Plans (grading, sections, water quality, planting)	30d	08-19-09	09-30-09	5d		AL1150, RD1110, AL1210, EN3340, EN3500, EN3620	PS6160, RD1200, EN3900
RD1200	5d/Wk ...	Continue Roadside Development - CRB/HI/14	40d	10-01-09	11-25-09	155d		RD1140	DS1100, SW1200, TC1200, TD1200, RD1500
RD1500	5d/Wk ...	Continue Roadside Development - MD	30d	11-27-09	01-11-10	297d		RD1200	SW1500, TC1500, TD1500, DS5100, RD1800
RD1800	5d/Wk ...	Continue Roadside Development - 500/MP/FP	460d	01-12-10	10-28-11	25d		RD1500	DS6100
Access Management			331d	01-20-09	05-05-10	75d			
ODOT Interchange Area Management Plan (IAMP) - 5.11			235d	01-20-09	12-18-09	79d			
AM1050	5d/Wk ...	Hayden Island / Marine Dr IAMP Prep & Acceptance	235d	01-20-09	12-18-09	79d		PM1010	EN4600, EN4460, DD1600
Access Planning / IAMR - 5.10			210d	02-05-09	12-01-09	183d			
AM1500	5d/Wk ...	IAMR (Interchange Access Modification Report) Development	60d	02-05-09	04-29-09	183d		KD1110, KD1120, KD1130	AM1510
AM1510	5d/Wk ...	CRC Internal Review	50d	02-19-09	04-29-09	183d		AM1500	AM1520
AM1520	5d/Wk ...	IAMR Support Team (WSDOT/ODOT/FHWA) Meeting	1d	04-30-09	04-30-09	183d		AM1510	AM1530
AM1530	5d/Wk ...	IAMR Support Team Review	10d	05-01-09	05-14-09	183d		AM1520	AM1540
AM1540	5d/Wk ...	Reconcile Comments	8d	05-15-09	05-27-09	183d		AM1530	AM1550
AM1550	5d/Wk ...	IAMR Support Team Meeting #2	1d	05-28-09	05-28-09	183d		AM1540	AM1560
AM1560	5d/Wk ...	IAMR Final Plan Development	9d	05-29-09	06-10-09	183d		AM1550	AM1570
AM1570	5d/Wk ...	IAMR Support Team Concurrence Meeting	1d	06-11-09	06-11-09	183d		AM1560	AM1580
AM1580	5d/Wk ...	Submit IAMR to FHWA (Wash, DC) for Conceptual Approval	30d	06-12-09	07-24-09	183d		AM1570	AM1590
AM1590	5d/Wk ...	Conceptual IAMR Approval Received (Pre-ROD)	0d		07-24-09	183d		AM1580	AM1600, EN4900
AM1600	5d/Wk ...	IAMR Plan Update	10d	07-27-09	08-07-09	183d		AM1590	AM1610
AM1610	5d/Wk ...	IAMR Support Team Final Review	10d	08-10-09	08-21-09	183d		AM1600	AM1620
AM1620	5d/Wk ...	Reconcile Comments	10d	08-24-09	09-04-09	183d		AM1610	AM1630
AM1630	5d/Wk ...	Submit IAMR to FHWA (Wash, DC) for Final Approval	60d	09-08-09	12-01-09	183d		AM1620	AM1640
AM1640	5d/Wk ...	IAMR Approval Received - AF5009	0d		12-01-09	183d		AM1630	RW1200
WSDOT Access Management			201d	07-23-09	05-05-10	75d			
AM1800	5d/Wk ...	Prepare Access Report Plan	40d	07-23-09	09-17-09	0d		RE1310	AM1810, AM1820
AM1810	5d/Wk ...	Access Report Plan Approval	0d		09-17-09	75d		AM1800	AM1860
AM1820	5d/Wk ...	Prepare Final Access Hearing Plan	40d	09-18-09	11-12-09	0d		AM1800	AM1840, AM1830
AM1830	5d/Wk ...	Prepare Prehearing Packet	40d	09-22-09	11-16-09	0d		AM1820	AM1860, AM1850
AM1840	5d/Wk ...	Access Hearing Plan Approval (r/w complete)	0d		11-12-09	2d		AM1820	AM1850
AM1850	5d/Wk ...	Notice of Mailing and Mailing	0d		11-16-09	0d		AM1840, AM1830	AM1860
AM1860	5d/Wk ...	R/W & L/A Hearing	1d	01-06-10	01-06-10	0d		AM1850, AM1810, AM1830	AM1870
AM1870	5d/Wk ...	Findings and Order Plan	80d	01-07-10	04-28-10	0d		AM1860	AM1920
AM1920	5d/Wk ...	Findings and Order Adopted	0d		04-28-10	0d		AM1870	AM1930, RE1330
AM1930	5d/Wk ...	Final Legal R/W and L/A Plan	5d	04-29-10	05-05-10	75d		AM1920	RE1350
Traffic Design			606d	06-15-09	10-28-11	25d			
Signal, Signing, Striping & Illumination			606d	06-15-09	10-28-11	25d			
TD1110	5d/Wk ...	Identify Locations for Signals	10d	06-15-09	06-26-09	251d		AL1150, AL1410	AL1320, TD1200
TD1120	5d/Wk ...	Draft Conceptual Destination Signing	10d	06-15-09	06-26-09	251d		AL1150, AL1410	AL1320, TD1200
TD1200	5d/Wk ...	Continue Signals & Signing - CRB/HI/14	40d	10-15-09	12-10-09	175d		TD1120, TD1110, RD1200	DS1100, TD1500
TD1500	5d/Wk ...	Continue Signals & Signing - MD	20d	01-12-10	02-08-10	317d		RD1500, TD1200	TD1800, DS5100
TD1800	5d/Wk ...	Continue Signals & Signing - 500/MP/FP	440d	02-09-10	10-28-11	25d		TD1500	DS6100
Structures & Geotech			130...	09-02-08	10-15-13	251d			
Landside Bridge & Wall Conceptual Design - Initial			324d	09-02-08	12-08-09	32d			
Preliminary WA Landside Geotechnical			45d	09-02-08	11-03-08	221d			
GT0110	5d/Wk ...	Preliminary WA Landside Geotech Reccommendations	45d	09-02-08	11-03-08	221d		PM1010	GT0120
GT0120	5d/Wk ...	Preliminary WA Landside Geotech Reccommendations Complete	0d		11-03-08	221d		GT0110	ST0150
Layout and Sketches			270d	11-17-08	12-08-09	32d			
ST0130	5d/Wk ...	Highway Design Line and Grade Set (From Highway Group)	0d	11-17-08		32d		AL1130	ST0140
ST0140	5d/Wk ...	Layout and Sketches	180d	11-17-08	07-31-09	32d		ST0130	ST0150
ST0150	5d/Wk ...	Matrix/Quantities	20d	08-03-09	08-28-09	32d		ST0140, GT0120, GT0210	ST0160
ST0160	5d/Wk ...	CRC/WSDOT Review Cycle	30d	08-31-09	10-12-09	32d		ST0150	ST0170
ST0170	5d/Wk ...	FTA/FHWA Review Cycle	40d	10-13-09	12-08-09	32d		ST0160	ST0180
ST0180	5d/Wk ...	Landside Bridge and Wall Sketches Complete - AF8017	0d		12-08-09	32d		ST0170	ST0600, ST5100, ST6100
Preliminary OR Landside Geotechnical			55d	12-26-08	03-13-09	130d			
GT0190	5d/Wk ...	Preliminary OR Landside Geotech Reccommendations	45d	12-26-08	02-27-09	130d		GT0340	GT0200
GT0200	5d/Wk ...	Review Cycle	10d	03-02-09	03-13-09	130d		GT0190	GT0210
GT0210	5d/Wk ...	Preliminary OR Landside Geotech Reccommendations Complete - AF8019	0d		03-13-09	130d		GT0200	ST0150
River Crossing Structures & Geotech - Initial			424d	09-02-08	04-29-10	32d			
BA Support			407d	09-02-08	04-06-10	14d			
ST0220	5d/Wk ...	BA - Verify River Bridge Foundation Size	20d	09-02-08	09-29-08	25d		PM1010	ST0230
ST0230	5d/Wk ...	BA Support Documentation	25d	09-30-08	11-03-08	25d		ST0220	ST0240
ST0240	5d/Wk ...	BA Support Documentation CRC Review	10d	11-04-08	11-17-08	25d		ST0230	ST0250, ST0390, EN0170
ST0250	5d/Wk ...	BA Support Material to ENV - AF8051	0d		11-17-08	62d		ST0240	EN2110, EN2100, EN2130, ST0260
ST0260	5d/Wk ...	Ongoing BA Support	352d	11-18-08	04-06-10	14d		ST0250	EN2500
Technical Screening Study			84d	09-02-08	12-30-08	22d			
ST0270	5d/Wk ...	Tech Screening Workshop Prep	32d	09-02-08	10-15-08	22d		PM1010	ST0280
ST0280	5d/Wk ...	Tech Screening Workshop	2d	10-16-08	10-17-08	22d		ST0270	ST0290
ST0290	5d/Wk ...	Tech Screening Report	20d	10-20-08	11-14-08	22d		ST0280	ST0300
ST0300	5d/Wk ...	Tech Screening CRC Review Cycle	10d	11-17-08	12-01-08	22d		ST0290	ST0310

Columbia River CROSSING

Remaining Work | Critical Remaining Work | Actual Work | Remaining Level of Effort | Milestone

Data Date: 09-01-08

Print Date/Time: 05-28-09 12:10

CRC Project Schedule (Baseline w/ current data through 4/22/09)

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
ST0310	5d/Wk ...	Tech Screening Panel Review Cycle	20d	12-02-08	12-30-08	22d		ST0300	ST0320
ST0320	5d/Wk ...	Technical Screeing Study Complete - AF8045	0d		12-30-08	22d		ST0310	ST0420, ST0520, ST0510
Phase "A" Geotechnical			120d	11-12-08	05-01-09	4d			
GT0330	5d/Wk ...	Exploration/Drilling	10d	11-12-08	11-25-08	4d		PM1010, EN1500	GT0340
GT0340	5d/Wk ...	Testing/Data Reports - AF8029	20d	11-26-08	12-24-08	4d		GT0330	GT0350, GT0360, GT0190, EN0180
GT0350	5d/Wk ...	Preliminary Refined Liquefaction Assessment	30d	12-26-08	02-06-09	4d		GT0340	GT0370, ST0510
GT0360	5d/Wk ...	Preliminary Lateral Spreading Assessment	30d	12-26-08	02-06-09	4d		GT0340	GT0370, ST0510
GT0370	5d/Wk ...	CRC Review Cycle	60d	02-09-09	05-01-09	4d		GT0350, GT0360	GT0380
GT0380	5d/Wk ...	Liquefaction & Lateral Spreading (Ph A) Complete - AF8034	0d		05-01-09	4d		GT0370	GT1100
Sole Source Aquifer			145d	11-18-08	06-12-09	25d			
ST0390	5d/Wk ...	SSA Narrative & Graphics	115d	11-18-08	04-30-09	25d		ST0240	ST0400
ST0400	5d/Wk ...	SSA Review Cycle	30d	05-01-09	06-12-09	25d		ST0390	ST0410
ST0410	5d/Wk ...	Sole Source Aquifer Structures Input Complete	0d		06-12-09	25d		ST0400	EN1550
Aesthetic Screening Study			71d	12-31-08	04-09-09	22d			
ST0420	5d/Wk ...	Aesthetic Screening Workshop Prep	20d	12-31-08	01-28-09	22d		ST0320	ST0430
ST0430	5d/Wk ...	Aesthetic Screening Workshop	1d	01-29-09	01-29-09	22d		ST0420	ST0440
ST0440	5d/Wk ...	Aesthetic Screening Report	20d	01-30-09	02-26-09	22d		ST0430	ST0450
ST0450	5d/Wk ...	Aesthetic Screeing Report CRC Review Cycle	10d	02-27-09	03-12-09	22d		ST0440	ST0460
ST0460	5d/Wk ...	Aesthetic Screening UDAG Review Cycle	20d	03-13-09	04-09-09	22d		ST0450	ST0470
ST0470	5d/Wk ...	Aesthetic Screeing Study Complete - AF8050	0d		04-09-09	22d		ST0460	ST0540
Preliminary Ship Impact Memo			60d	01-09-09	04-02-09	5d			
ST0480	5d/Wk ...	Preliminary Ship Impact Study	30d	01-09-09	02-19-09	5d		PM1010	ST0490
ST0490	5d/Wk ...	Preliminary Ship Impact CRC Review Cycle	30d	02-20-09	04-02-09	5d		ST0480	ST0500
ST0500	5d/Wk ...	Preliminary Ship Impact Memo Complete - AF8052	0d		04-02-09	5d		ST0490	ST0510
Formal Type Study			171d	01-29-09	09-29-09	81d			
ST0510	5d/Wk ...	Study/Calcualtions	60d	01-29-09	04-22-09	5d		ST0320, ST0500, GT0350, GT0360	ST0520, ST0530, EN2130
ST0520	5d/Wk ...	Narrative Development	55d	03-16-09	06-01-09	6d		ST0320, ST0510, ST0530	ST0540
ST0530	5d/Wk ...	Cost Estimates	34d	04-13-09	05-29-09	7d		ST0510	ST0520
ST0540	5d/Wk ...	Assemble Draft Formal Type Study Package	25d	05-04-09	06-08-09	6d		ST0470, ST0520	ST0550, ST0560
ST0550	5d/Wk ...	Formal Type Study CRC Review Cycle	35d	05-08-09	06-26-09	6d		ST0540	ST0600, ST0570, KD1140
ST0560	5d/Wk ...	HANDOFF CR&NPH Pkg's to Env (incl Aviat & Nav Tech Rpts - AF6030/29)	0d	05-22-09		6d		ST0540	EN0260
ST0570	5d/Wk ...	Formal Type Study DOT Review Cycle	35d	06-08-09	07-27-09	81d		ST0550	ST0580
ST0580	5d/Wk ...	Formal Type Study FHWA/FTA Review Cycle	60d	07-07-09	09-29-09	81d		ST0570	ST0590, ST0600
ST0590	5d/Wk ...	Formal Type Study Complete - AF8047/48/49	0d		09-29-09	81d		ST0580	ST0600
CRB/HI/14 TS&L/Prelim Plan Development (includes Approaches)			160d	09-15-09	04-29-10	32d			
ST0600	5d/Wk ...	STR CRB/HI/14 Prelim Plans/TS&L Development	60d	09-15-09	12-08-09	32d		ST0550, ST0580, ST0590, ST0180	ST0610
ST0610	5d/Wk ...	STR CRB/HI/14 Prelim Plans/TS&L Complete - AF8014/15/16	0d		12-08-09	32d		ST0600	ST0620
ST0620	5d/Wk ...	STR CRB/HI/14 Prelim QA/QC Internal	10d	12-09-09	12-22-09	32d		ST0610	ST0630
ST0630	5d/Wk ...	STR CRB/HI/14 Prelim Reconcile Comments (Internal)	10d	12-23-09	01-07-10	32d		ST0620	ST0650, ST0640
ST0640	5d/Wk ...	STR CRB/HI/14 Prelim DOT HQ Bridge Review	30d	01-08-10	02-18-10	32d		ST0630	ST0660
ST0650	5d/Wk ...	STR CRB/HI/14 Prelim Constructablity Review	30d	01-08-10	02-18-10	32d		ST0630	ST0660
ST0660	5d/Wk ...	STR CRB/HI/14 Prelim Reconcile Comments (DOT HQ Br)	10d	02-19-10	03-04-10	32d		ST0640, ST0650	ST0690, ST0680, ST0670
ST0670	5d/Wk ...	STR CRB/HI/14 Prelim Federal Review	30d	03-05-10	04-15-10	32d		ST0660	ST0700
ST0680	5d/Wk ...	STR CRB/HI/14 Prelim Transit Review	30d	03-05-10	04-15-10	32d		ST0660	ST0700
ST0690	5d/Wk ...	STR CRB/HI/14 Prelim Local Agency Review	30d	03-05-10	04-15-10	32d		ST0660	ST0700
ST0700	5d/Wk ...	STR CRB/HI/14 Prelim Reconcile Comments (Federal/Transit/Local)	10d	04-16-10	04-29-10	32d		ST0670, ST0680, ST0690	ST0710
ST0710	5d/Wk ...	STR CRB/HI/14 Prelim Plan/TS&L Complete	0d		04-29-10	32d		ST0700	GT1300, EP3100, EP0200, ST1390
CRB/HI/14 Structures & Geotech Design			500d	12-04-09	11-18-11	126d			
GEO CRB/HI/14 Test Pile/Shaft Program			370d	12-04-09	05-17-11	65d			
GT1100	5d/Wk ...	Test Pile/Shaft Scoping	30d	12-04-09	01-18-10	4d		GT0380	GT1110
GT1110	5d/Wk ...	Test Pile/Shaft Bid Document Development	80d	01-19-10	05-10-10	4d		GT1100	GT1130
GT1130	5d/Wk ...	Test Pile/Shaft Internal Review	10d	05-11-10	05-24-10	4d		GT1110	GT1140
GT1140	5d/Wk ...	Test Pile/Shaft DOT Review	30d	05-25-10	07-07-10	4d		GT1130	GT1150
GT1150	5d/Wk ...	Test Pile/Shaft Reconcile Comments	10d	07-08-10	07-21-10	4d		GT1140	GT1160
GT1160	5d/Wk ...	Test Pile/Shaft Bid Documents Complete	0d		07-21-10	4d		GT1150	GT1170
GT1170	5d/Wk ...	Test Pile/Shaft AD/Bid/Award	90d	07-22-10	11-26-10	4d		GT1160	GT1180
GT1180	5d/Wk ...	Test Pile/Shaft Execute Program (Contract)	60d	11-29-10*	02-22-11*	4d	11-01-10	GT1170	GT1190
GT1190	5d/Wk ...	Test Pile/Shaft Analyze Data & Develop Report	25d	02-23-11	03-29-11	25d		GT1180	GT1200, ST1600
GT1200	5d/Wk ...	Test Pile/Shaft Internal Review	10d	03-30-11	04-12-11	65d		GT1190	GT1210
GT1210	5d/Wk ...	Test Pile/Shaft DOT Review	20d	04-13-11	05-10-11	65d		GT1200	GT1220
GT1220	5d/Wk ...	Test Pile/Shaft Reconcile Comments	5d	05-11-11	05-17-11	65d		GT1210	GT1230
GT1230	5d/Wk ...	Test Pile/Shaft Report Complete	0d		05-17-11	65d		GT1220	ST1800
GEO CRB/HI/14 Project Geotechnical Investigation/Report			180d	03-05-10	11-16-10	192d			
GT1300	5d/Wk ...	GEO CRB/HI/14 Final Exploration Scoping	40d	03-05-10	04-29-10	167d		ST0710	GT1320, GT1310
GT1310	5d/Wk ...	GEO CRB/HI/14 Time History Development	30d	04-30-10	06-11-10	167d		GT1300	ST1600
GT1320	5d/Wk ...	GEO CRB/HI/14 Exploration/Drilling	40d	04-30-10	06-25-10	167d		GT1300	GT1330, SW2100
GT1330	5d/Wk ...	GEO CRB/HI/14 Testing/Data Report	30d	06-28-10	08-09-10	167d		GT1320	GT1340
GT1340	5d/Wk ...	GEO CRB/HI/14 Final Geotechnical Recommendations	40d	08-10-10	10-05-10	167d		GT1330	GT1350, ST1600
GT1350	5d/Wk ...	GEO CRB/HI/14 Review Cycle	30d	10-06-10	11-16-10	192d		GT1340	GT1360
GT1360	5d/Wk ...	GEO CRB/HI/14 Final Geotechnical Report Complete	0d		11-16-10	192d		GT1350	ST1800
STR CRB/HI/14 Scoping			30d	04-30-10	06-11-10	32d			
ST1390	5d/Wk ...	STR CRB/HI/14 Structures Scoping	30d	04-30-10	06-11-10	32d		ST0710	ST1400
STR CRB/HI/14 60% Design			150d	06-14-10	01-14-11	107d			
ST1400	5d/Wk ...	STR CRB/HI/14 60% Design Development	90d	06-14-10	10-19-10	32d		ST1390, TR2500	ST1410
ST1410	5d/Wk ...	STR CRB/HI/14 60% Design READY FOR REVIEW	0d		10-19-10	32d		ST1400	ST1420
ST1420	5d/Wk ...	STR CRB/HI/14 60% QA/QC Internal	10d	10-20-10	11-02-10	32d		ST1410	ST1430
ST1430	5d/Wk ...	STR CRB/HI/14 60% Reconcile Comments (Internal)	5d	11-03-10	11-09-10	32d		ST1420	ST1440, ST1450, ST1460, ST1470, ST1480
ST1440	5d/Wk ...	STR CRB/HI/14 60% DOT HQ Bridge Review	30d	11-10-10	12-22-10	32d		ST1430	ST1600, ST1490
ST1450	5d/Wk ...	STR CRB/HI/14 60% Constructability Review	30d	11-10-10	12-22-10	107d		ST1430	ST1490
ST1460	5d/Wk ...	STR CRB/HI/14 60% Federal Review	30d	11-10-10	12-22-10	107d		ST1430	ST1490
ST1470	5d/Wk ...	STR CRB/HI/14 60% Transit Review	30d	11-10-10	12-22-10	107d		ST1430	ST1490

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
ST1480	5d/Wk ...	STR CRB/HI/14 60% Local Agency Review	30d	11-10-10	12-22-10	107d		ST1430	ST1490
ST1490	5d/Wk ...	STR CRB/HI/14 60% Reconcile Comments (DOT Br/Const Rev/Fed/Transit/L...	15d	12-23-10	01-14-11	107d		ST1460, ST1470, ST1480, ST1440, ST1450	ST1600
STR CRB/HI/14 90% Design			150d	01-05-11	08-04-11	70d			
ST1600	5d/Wk ...	STR CRB/HI/14 90% Design Development	90d	01-05-11	05-10-11	25d		ST1490, GT1310, GT1340, ST1440, GT1190, TR2700	ST1610
ST1610	5d/Wk ...	STR CRB/HI/14 90% Design READY FOR REVIEW	0d		05-10-11	25d		ST1600	ST1620
ST1620	5d/Wk ...	STR CRB/HI/14 90% QA/QC Internal	10d	05-11-11	05-24-11	25d		ST1610	ST1630
ST1630	5d/Wk ...	STR CRB/HI/14 90% Reconcile Comments (Internal)	5d	05-25-11	06-01-11	25d		ST1620	ST1640, ST1650, ST1660, ST1670, ST1680
ST1640	5d/Wk ...	STR CRB/HI/14 90% DOT HQ Bridge Review	30d	06-02-11	07-14-11	25d		ST1630	ST1800, ST1690
ST1650	5d/Wk ...	STR CRB/HI/14 90% Constructability Review	30d	06-02-11	07-14-11	70d		ST1630	ST1690
ST1660	5d/Wk ...	STR CRB/HI/14 90% Federal Review	30d	06-02-11	07-14-11	70d		ST1630	ST1690
ST1670	5d/Wk ...	STR CRB/HI/14 90% Transit Review	30d	06-02-11	07-14-11	70d		ST1630	ST1690
ST1680	5d/Wk ...	STR CRB/HI/14 90% Local Agency Review	30d	06-02-11	07-14-11	70d		ST1630	ST1690
ST1690	5d/Wk ...	STR CRB/HI/14 90% Reconcile Comments (DOT Br/Const Rev/Fed/Transit/L...	15d	07-15-11	08-04-11	70d		ST1660, ST1670, ST1680, ST1640, ST1650	ST1800
STR CRB/HI/14 100% Design			90d	07-15-11	11-18-11	126d			
ST1800	5d/Wk ...	STR CRB/HI/14 100% Design Development	60d	07-15-11	10-07-11	25d		ST1690, GT1360, ST1640, GT1230	ST1810
ST1810	5d/Wk ...	STR CRB/HI/14 100% Design READY FOR REVIEW	0d		10-07-11	25d		ST1800	ST1820
ST1820	5d/Wk ...	STR CRB/HI/14 100% QA/QC Internal	5d	10-10-11	10-14-11	25d		ST1810	ST1830
ST1830	5d/Wk ...	STR CRB/HI/14 100% Reconcile Comments (Internal)	5d	10-17-11	10-21-11	25d		ST1820	ST1840, ST1850, ST1860, ST1880, ST1870
ST1840	5d/Wk ...	STR CRB/HI/14 100% DOT HQ Bridge Review	10d	10-24-11	11-04-11	126d		ST1830	ST1890
ST1850	5d/Wk ...	STR CRB/HI/14 100% Constructability Review	10d	10-24-11	11-04-11	25d		ST1830	CR1850, ST1890
ST1860	5d/Wk ...	STR CRB/HI/14 100% Federal Review	10d	10-24-11	11-04-11	126d		ST1830	ST1890
ST1870	5d/Wk ...	STR CRB/HI/14 100% Transit Review	10d	10-24-11	11-04-11	126d		ST1830	ST1890
ST1880	5d/Wk ...	STR CRB/HI/14 100% Local Agency Review	10d	10-24-11	11-04-11	126d		ST1830	ST1890
ST1890	5d/Wk ...	STR CRB/HI/14 100% Reconcile Comments (DOT Br/Const Rev/Fed/Transit/...	10d	11-07-11	11-18-11	126d		ST1860, ST1870, ST1880, ST1840, ST1850	ST1900
ST1900	5d/Wk ...	STR CRB/HI/14 100% Design Package Complete	0d		11-18-11	126d		ST1890	PS1900
MD Structures & Geotech Design			485d	04-12-10	03-06-12	370d			
STR MD Preliminary Plan/TS&L			115d	04-12-10	09-22-10	325d			
ST5100	5d/Wk ...	STR MD Prelim Plans/TS&L Development	60d	04-12-10	07-06-10	325d		DS5100, ST0180	ST5110
ST5110	5d/Wk ...	STR MD Prelim Plans/TS&L READY FOR REVIEW	0d		07-06-10	325d		ST5100	ST5120
ST5120	5d/Wk ...	STR MD Prelim QA/QC Internal	10d	07-07-10	07-20-10	325d		ST5110	ST5130
ST5130	5d/Wk ...	STR MD Prelim Reconcile Comments (Internal)	5d	07-21-10	07-27-10	325d		ST5120	ST5140, ST5150, ST5160, ST5180
ST5140	5d/Wk ...	STR MD Prelim DOT HQ Bridge Review	30d	07-28-10	09-08-10	325d		ST5130	ST5190
ST5150	5d/Wk ...	STR MD Prelim Plan/TS&L Constructability Review	30d	07-28-10	09-08-10	325d		ST5130	ST5190
ST5160	5d/Wk ...	STR MD Prelim Federal Review	30d	07-28-10	09-08-10	325d		ST5130	ST5190
ST5180	5d/Wk ...	STR MD Prelim Local Agency Review	30d	07-28-10	09-08-10	325d		ST5130	ST5190
ST5190	5d/Wk ...	STR MD Prelim Reconcile Comments (DOT Br/Const Rev/Fed/Local)	10d	09-09-10	09-22-10	325d		ST5160, ST5180, ST5140, ST5150	ST5400, ST5200
ST5200	5d/Wk ...	STR MD Prelim Plan/TS&L Complete	0d		09-22-10	325d		ST5190	ST5400, GT5300
GEO MD Geotechnical Investigation/Report			180d	07-28-10	04-11-11	465d			
GT5300	5d/Wk ...	GEO MD Final Exploration Scoping	40d	07-28-10	09-22-10	435d		ST5200	GT5320, GT5310
GT5310	5d/Wk ...	GEO MD Time History Development	30d	09-23-10	11-03-10	435d		GT5300	ST5600
GT5320	5d/Wk ...	GEO MD Exploration/Drilling	40d	09-23-10	11-17-10	445d		GT5300	GT5330
GT5330	5d/Wk ...	GEO MD Testing/Data Report	30d	11-18-10	01-03-11	445d		GT5320	GT5340
GT5340	5d/Wk ...	GEO MD Final Geotechnical Recommendations	40d	01-04-11	02-28-11	445d		GT5330	GT5350, ST5600
GT5350	5d/Wk ...	GEO MD Review Cycle	30d	03-01-11	04-11-11	465d		GT5340	GT5360
GT5360	5d/Wk ...	GEO MD Final Geotechnical Report Complete	0d		04-11-11	465d		GT5350	ST5800
STR MD 60% Design			150d	09-23-10	04-25-11	405d			
ST5400	5d/Wk ...	STR MD 60% Design Development	90d	09-23-10	01-31-11	325d		ST5190, ST5200	ST5410
ST5410	5d/Wk ...	STR MD 60% Design READY FOR REVIEW	0d		01-31-11	325d		ST5400	ST5420
ST5420	5d/Wk ...	STR MD 60% QA/QC Internal	10d	02-01-11	02-14-11	325d		ST5410	ST5430
ST5430	5d/Wk ...	STR MD 60% Reconcile Comments (Internal)	10d	02-15-11	02-28-11	325d		ST5420	ST5440, ST5450, ST5460, ST5480
ST5440	5d/Wk ...	STR MD 60% DOT HQ Bridge Review	30d	03-01-11	04-11-11	325d		ST5430	ST5490, ST5600
ST5450	5d/Wk ...	STR MD 60% Constructability Review	30d	03-01-11	04-11-11	405d		ST5430	ST5490
ST5460	5d/Wk ...	STR MD 60% Federal Review	30d	03-01-11	04-11-11	405d		ST5430	ST5490
ST5480	5d/Wk ...	STR MD 60% Local Agency Review	30d	03-01-11	04-11-11	405d		ST5430	ST5490
ST5490	5d/Wk ...	STR MD 60% Reconcile Comments (DOT Br/Const Rev/Fed/Local)	10d	04-12-11	04-25-11	405d		ST5460, ST5480, ST5440, ST5450	ST5600
STR MD 90% Design			150d	04-12-11	11-10-11	375d			
ST5600	5d/Wk ...	STR MD 90% Design Development	90d	04-12-11	08-17-11	325d		ST5490, GT5310, GT5340, ST5440	ST5610
ST5610	5d/Wk ...	STR MD 90% Design READY FOR REVIEW	0d		08-17-11	325d		ST5600	ST5620
ST5620	5d/Wk ...	STR MD 90% QA/QC Internal	10d	08-18-11	08-31-11	325d		ST5610	ST5630
ST5630	5d/Wk ...	STR MD 90% Reconcile Comments (Internal)	10d	09-01-11	09-15-11	325d		ST5620	ST5640, ST5650, ST5660, ST5680
ST5640	5d/Wk ...	STR MD 90% DOT HQ Bridge Review	30d	09-16-11	10-27-11	325d		ST5630	ST5690, ST5800
ST5650	5d/Wk ...	STR MD 90% Constructability Review	30d	09-16-11	10-27-11	375d		ST5630	ST5690
ST5660	5d/Wk ...	STR MD 90% Federal Review	30d	09-16-11	10-27-11	375d		ST5630	ST5690
ST5680	5d/Wk ...	STR MD 90% Local Agency Review	30d	09-16-11	10-27-11	375d		ST5630	ST5690
ST5690	5d/Wk ...	STR MD 90% Reconcile Comments (DOT Br/Const Rev/Fed/Local)	10d	10-28-11	11-10-11	375d		ST5660, ST5680, ST5640, ST5650	ST5800
STR MD 100% Design			90d	10-28-11	03-06-12	370d			
ST5800	5d/Wk ...	STR MD 100% Design Development	60d	10-28-11	01-24-12	325d		ST5690, GT5360, ST5640	ST5810
ST5810	5d/Wk ...	STR MD 100% Design READY FOR REVIEW	0d		01-24-12	325d		ST5800	ST5820
ST5820	5d/Wk ...	STR MD 100% QA/QC Internal	5d	01-25-12	01-31-12	325d		ST5810	ST5830
ST5830	5d/Wk ...	STR MD 100% Reconcile Comments (Internal)	5d	02-01-12	02-07-12	325d		ST5820	ST5840, ST5850, ST5860, ST5880
ST5840	5d/Wk ...	STR MD 100% DOT HQ Bridge Review	10d	02-08-12	02-21-12	370d		ST5830	ST5890
ST5850	5d/Wk ...	STR MD 100% Constructability Review	10d	02-08-12	02-21-12	325d		ST5830	ST5890, CR5850
ST5860	5d/Wk ...	STR MD 100% Federal Review	10d	02-08-12	02-21-12	370d		ST5830	ST5890
ST5880	5d/Wk ...	STR MD 100% Local Agency Review	10d	02-08-12	02-21-12	370d		ST5830	ST5890
ST5890	5d/Wk ...	STR MD 100% Reconcile Comments (DOT Br/Const Rev/Fed/Local)	10d	02-22-12	03-06-12	370d		ST5860, ST5880, ST5840, ST5850	ST5900
ST5900	5d/Wk ...	STR MD 100% Design Package Complete	0d		03-06-12	370d		ST5890	PS5900
500/MP/FP Structures & Geotech Design			485d	11-21-11	10-15-13	251d			
STR 500/MP/FP Preliminary Plan/TS&L			115d	11-21-11	05-02-12	201d			
ST6100	5d/Wk ...	STR 500/MP/FP Prelim Plans/TS&L Development	60d	11-21-11	02-15-12	201d		DS6100, ST0180	ST6110
ST6110	5d/Wk ...	STR 500/MP/FP Prelim Plans/TS&L READY FOR REVIEW	0d		02-15-12	201d		ST6100	ST6120
ST6120	5d/Wk ...	STR 500/MP/FP Prelim QA/QC Internal	10d	02-16-12	02-29-12	201d		ST6110	ST6130

Columbia River CROSSING

Remaining Work — Critical Remaining Work — Actual Work — Remaining Level of Effort — Milestone

Data Date: 09-01-08

Print Date/Time: 05-28-09 12:10

CRC Project Schedule (Baseline w/ current data through 4/22/09)

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
ST6130	5d/Wk ...	STR 500/MP/FP Prelim Reconcile Comments (Internal)	5d	03-01-12	03-07-12	201d		ST6120	ST6140, ST6150, ST6160, ST6180
ST6140	5d/Wk ...	STR 500/MP/FP Prelim DOT HQ Bridge Review	30d	03-08-12	04-18-12	201d		ST6130	ST6190
ST6150	5d/Wk ...	STR 500/MP/FP Prelim Plan/TS&L Constructability Review	30d	03-08-12	04-18-12	201d		ST6130	ST6190
ST6160	5d/Wk ...	STR 500/MP/FP Prelim Federal Review	30d	03-08-12	04-18-12	201d		ST6130	ST6190
ST6180	5d/Wk ...	STR 500/MP/FP Prelim Local Agency Review	30d	03-08-12	04-18-12	201d		ST6130	ST6190
ST6190	5d/Wk ...	STR 500/MP/FP Prelim Reconcile Comments (DOT Br/Const Rev/Fed/Local)	10d	04-19-12	05-02-12	201d		ST6160, ST6180, ST6140, ST6150	ST6400, ST6200
ST6200	5d/Wk ...	STR 500/MP/FP Prelim Plan/TS&L Complete	0d		05-02-12	201d		ST6190	ST6400, GT6300
GEO 500/MP/FP Geotechnical Investigation/Report			180d	03-08-12	11-19-12	341d			
GT6300	5d/Wk ...	GEO 500/MP/FP Final Exploration Scoping	40d	03-08-12	05-02-12	311d		ST6200	GT6320, GT6310
GT6310	5d/Wk ...	GEO 500/MP/FP Time History Development	30d	05-03-12	06-14-12	311d		GT6300	ST6600
GT6320	5d/Wk ...	GEO 500/MP/FP Exploration/Drilling	40d	05-03-12	06-28-12	321d		GT6300	GT6330
GT6330	5d/Wk ...	GEO 500/MP/FP Testing/Data Report	30d	06-29-12	08-10-12	321d		GT6320	GT6340
GT6340	5d/Wk ...	GEO 500/MP/FP Final Geotechnical Recommendations	40d	08-13-12	10-08-12	321d		GT6330	GT6350, ST6600
GT6350	5d/Wk ...	GEO 500/MP/FP Review Cycle	30d	10-09-12	11-19-12	341d		GT6340	GT6360
GT6360	5d/Wk ...	GEO 500/MP/FP Final Geotechnical Report Complete	0d		11-19-12	341d		GT6350	ST6800
STR 500/MP/FP 60% Design			150d	05-03-12	12-04-12	281d			
ST6400	5d/Wk ...	STR 500/MP/FP 60% Design Development	90d	05-03-12	09-10-12	201d		ST6190, ST6200	ST6410
ST6410	5d/Wk ...	STR 500/MP/FP 60% Design READY FOR REVIEW	0d		09-10-12	201d		ST6400	ST6420
ST6420	5d/Wk ...	STR 500/MP/FP 60% QA/QC Internal	10d	09-11-12	09-24-12	201d		ST6410	ST6430
ST6430	5d/Wk ...	STR 500/MP/FP 60% Reconcile Comments (Internal)	10d	09-25-12	10-08-12	201d		ST6420	ST6440, ST6450, ST6460, ST6480
ST6440	5d/Wk ...	STR 500/MP/FP 60% DOT HQ Bridge Review	30d	10-09-12	11-19-12	201d		ST6430	ST6490, ST6600
ST6450	5d/Wk ...	STR 500/MP/FP 60% Constructability Review	30d	10-09-12	11-19-12	281d		ST6430	ST6490
ST6460	5d/Wk ...	STR 500/MP/FP 60% Federal Review	30d	10-09-12	11-19-12	281d		ST6430	ST6490
ST6480	5d/Wk ...	STR 500/MP/FP 60% Local Agency Review	30d	10-09-12	11-19-12	281d		ST6430	ST6490
ST6490	5d/Wk ...	STR 500/MP/FP 60% Reconcile Comments (DOT Br/Const Rev/Fed/Local)	10d	11-20-12	12-04-12	281d		ST6460, ST6480, ST6440, ST6450	ST6600
STR 500/MP/FP 90% Design			150d	11-20-12	06-21-13	251d			
ST6600	5d/Wk ...	STR 500/MP/FP 90% Design Development	90d	11-20-12	03-28-13	201d		ST6490, GT6310, GT6340, ST6440	ST6610
ST6610	5d/Wk ...	STR 500/MP/FP 90% Design READY FOR REVIEW	0d		03-28-13	201d		ST6600	ST6620
ST6620	5d/Wk ...	STR 500/MP/FP 90% QA/QC Internal	10d	03-29-13	04-11-13	201d		ST6610	ST6630
ST6630	5d/Wk ...	STR 500/MP/FP 90% Reconcile Comments (Internal)	10d	04-12-13	04-25-13	201d		ST6620	ST6640, ST6650, ST6660, ST6680
ST6640	5d/Wk ...	STR 500/MP/FP 90% DOT HQ Bridge Review	30d	04-26-13	06-07-13	201d		ST6630	ST6690, ST6800
ST6650	5d/Wk ...	STR 500/MP/FP 90% Constructability Review	30d	04-26-13	06-07-13	251d		ST6630	ST6690
ST6660	5d/Wk ...	STR 500/MP/FP 90% Federal Review	30d	04-26-13	06-07-13	251d		ST6630	ST6690
ST6680	5d/Wk ...	STR 500/MP/FP 90% Local Agency Review	30d	04-26-13	06-07-13	251d		ST6630	ST6690
ST6690	5d/Wk ...	STR 500/MP/FP 90% Reconcile Comments (DOT Br/Const Rev/Fed/Local)	10d	06-10-13	06-21-13	251d		ST6660, ST6680, ST6640, ST6650	ST6800
STR 500/MP/FP 100% Design			90d	06-10-13	10-15-13	251d			
ST6800	5d/Wk ...	STR 500/MP/FP 100% Design Development	60d	06-10-13	09-03-13	201d		ST6690, GT6360, ST6640	ST6810
ST6810	5d/Wk ...	STR 500/MP/FP 100% Design READY FOR REVIEW	0d		09-03-13	201d		ST6800	ST6820
ST6820	5d/Wk ...	STR 500/MP/FP 100% QA/QC Internal	5d	09-04-13	09-10-13	201d		ST6810	ST6830
ST6830	5d/Wk ...	STR 500/MP/FP 100% Reconcile Comments (Internal)	5d	09-11-13	09-17-13	201d		ST6820	ST6840, ST6850, ST6860, ST6880
ST6840	5d/Wk ...	STR 500/MP/FP 100% DOT HQ Bridge Review	10d	09-18-13	10-01-13	251d		ST6830	ST6890
ST6850	5d/Wk ...	STR 500/MP/FP 100% Constructability Review	10d	09-18-13	10-01-13	201d		ST6830	CR6850, ST6890
ST6860	5d/Wk ...	STR 500/MP/FP 100% Federal Review	10d	09-18-13	10-01-13	251d		ST6830	ST6890
ST6880	5d/Wk ...	STR 500/MP/FP 100% Local Agency Review	10d	09-18-13	10-01-13	251d		ST6830	ST6890
ST6890	5d/Wk ...	STR 500/MP/FP 100% Reconcile Comments (DOT Br/Const Rev/Fed/Local)	10d	10-02-13	10-15-13	251d		ST6860, ST6880, ST6840, ST6850	ST6900
ST6900	5d/Wk ...	STR 500/MP/FP 100% Design Package Complete	0d		10-15-13	251d		ST6890	PS6900
RIGHT OF WAY ACQUISITIONS			158...	09-02-08	11-18-14	296d			
Highway ROW Acquisitions			927d	09-02-08	04-19-12	954d			
ROW Preliminary Estimates			481d	09-02-08	07-21-10	22d			
RW1110	5d/Wk ...	Preliminary Right of Way Costs	254d	09-02-08	08-28-09	248d		PM1010	RW1130
RW1130	5d/Wk ...	Project Funding Estimate	42d	07-01-09	08-28-09	248d		RW1110	RW1200
RW1200	5d/Wk ...	Right of Way Funding Approved	1d	07-21-10	07-21-10	22d		RW1130, EN4900, AM1640	RW1300
ROW Acquisitions			382d	08-23-10	02-21-12	0d			
RW1300	5d/Wk ...	ROW Acquisition (includes Sub-Surface Easements & Fed Land Acq's)	382d	08-23-10	02-21-12	0d		RW1200, RE1350	RW1410, RW1420, RW1430, RW1440, RW1450, RW2710, RW2720
ROW Certification			42d	02-22-12	04-19-12	954d			
RW1410	5d/Wk ...	ROW Certification - CRB/HI/14 Contract	42d	02-22-12	04-19-12	0d		RW1300	AA1110
RW1420	5d/Wk ...	ROW Certification - Fourth Plain Contract	42d	02-22-12	04-19-12	954d		RW1300	AA1610
RW1430	5d/Wk ...	ROW Certification - Mill Plain Contract	42d	02-22-12	04-19-12	736d		RW1300	AA1510
RW1440	5d/Wk ...	ROW Certification - SR500 Contract	42d	02-22-12	04-19-12	630d		RW1300	AA1710
RW1450	5d/Wk ...	ROW Certification - Marine Drive Contract	42d	02-22-12	04-19-12	338d		RW1300	AA1410
Transit ROW Acq's (per RAMP - Real Estate Acq & Mgmt Plan)			145...	03-11-09	11-18-14	161d			
RW2500	5d/Wk ...	PMOC Review of RAMP (to coincide with PMP Reviews)	39d	03-11-09	05-04-09	53d		TR0110	RW2510
RW2510	5d/Wk ...	Development of Preliminary Transit Property Database	255d	05-05-09	05-04-10	53d		RW2500	EN4900
RW2530	5d/Wk ...	Transit Pre-FFGA Hardship Property Acquisition (if applicable)	400d	10-12-11	05-06-13	0d		EN4900	TR5600
RW2600	5d/Wk ...	Transit Post-FFGA Property Acquisition	350d	05-07-13	09-19-14	51d		TR5600	TR8600, TR8000, RW2710, RW2720, TR7800
RW2710	5d/Wk ...	ROW Certification - Transit South	42d	09-22-14	11-18-14	51d		RW1300, RW2600	TR8000, TR8100
RW2720	5d/Wk ...	ROW Certification - Transit North	42d	09-22-14	11-18-14	161d		RW1300, RW2600	TR8600, TR7800
PROJECT DESIGN / PS&E / REVIEWS			113...	03-22-10	09-04-14	25d			
CRB/HI/14 Design / PS&E / Reviews			441d	03-22-10	12-12-11	111d			
CRB/HI/14 Initial Design, PS&E & Reviews			130d	03-22-10	09-22-10	106d			
CRB/HI/14 Initial Design & PS&E			70d	03-22-10	06-28-10	106d			
DS1100	5d/Wk ...	CRB/HI/14 Initial Design Development	35d	03-22-10	05-07-10	106d		TC1200, RD1200, TD1200, AL1210, AL1220, SW1200, DD1600	DS1105, SW2100
DS1105	5d/Wk ...	CRB/HI/14 Initial Plan Development	35d	04-19-10	06-07-10	106d		DS1100	DS1110
DS1110	5d/Wk ...	CRB/HI/14 Initial Plans READY FOR REVIEW	0d		06-07-10	106d		DS1105	DS1120
DS1120	5d/Wk ...	CRB/HI/14 Initial QA/QC Internal	10d	06-08-10	06-21-10	106d		DS1110	DS1130
DS1130	5d/Wk ...	CRB/HI/14 Initial Reconcile Comments (Internal)	5d	06-22-10	06-28-10	106d		DS1120	CR1150, PS1160, PS1170, PS1180, DS1400
CRB/HI/14 Initial Constructibility Review			20d	06-29-10	07-27-10	106d			
CR1150	5d/Wk ...	CRB/HI/14 Initial Constructability Review	20d	06-29-10	07-27-10	106d		DS1130	PS1160, PS1170, PS1180
CRB/HI/14 Initial PS&E Reviews			40d	07-28-10	09-22-10	106d			

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
PS1160	5d/Wk ...	CRB/HI/14 Initial PS&E - Region & Transit Review	20d	07-28-10	08-24-10	106d		DS1130, CR1150	PS1190
PS1170	5d/Wk ...	CRB/HI/14 Initial PS&E - Local Agency Review	20d	07-28-10	08-24-10	106d		DS1130, CR1150	PS1190
PS1180	5d/Wk ...	CRB/HI/14 Initial PS&E - State & Federal Review	20d	07-28-10	08-24-10	106d		DS1130, CR1150	PS1190
PS1190	5d/Wk ...	CRB/HI/14 Initial PS&E - Reconcile Comments (Reg/Tran/Local/State/Fed)	20d	08-25-10	09-22-10	106d		PS1180, PS1160, PS1170	DS1410, EP1850
CRB/HI/14 60% Design, PS&E & Reviews			137d	07-21-10	02-02-11	139d			
CRB/HI/14 60% Design & PS&E			77d	07-21-10	11-05-10	139d			
DS1400	5d/Wk ...	CRB/HI/14 60% Design Development	42d	07-21-10	09-17-10	139d		DS1130, EN4900	DS1405
DS1405	5d/Wk ...	CRB/HI/14 60% Plan Development	42d	08-18-10	10-15-10	139d		DS1400	DS1410
DS1410	5d/Wk ...	CRB/HI/14 60% Plans READY FOR REVIEW	0d		10-15-10	139d		DS1405, PS1190	DS1420
DS1420	5d/Wk ...	CRB/HI/14 60% QA/QC Internal	10d	10-18-10	10-29-10	139d		DS1410	DS1430
DS1430	5d/Wk ...	CRB/HI/14 60% Reconcile Comments (Internal)	5d	11-01-10	11-05-10	139d		DS1420	PS1460, PS1470, CR1450, PS1480, DS1600
CRB/HI/14 60% Constructibility Review			20d	11-08-10	12-06-10	139d			
CR1450	5d/Wk ...	CRB/HI/14 60% Constructabiltiy Review	20d	11-08-10	12-06-10	139d		DS1430	PS1460, PS1470, PS1480
CRB/HI/14 60% PS&E Reviews			40d	12-07-10	02-02-11	139d			
PS1460	5d/Wk ...	CRB/HI/14 60% PS&E - Region & Transit Review	20d	12-07-10	01-05-11	139d		DS1430, CR1450	PS1490
PS1470	5d/Wk ...	CRB/HI/14 60% PS&E - Local Agency Review	20d	12-07-10	01-05-11	139d		DS1430, CR1450	PS1490
PS1480	5d/Wk ...	CRB/HI/14 60% PS&E - State & Federal Review	20d	12-07-10	01-05-11	139d		DS1430, CR1450	PS1490
PS1490	5d/Wk ...	CRB/HI/14 60% PS&E - Reconcile Comments (Reg/Tran/Local/State/Fed)	20d	01-06-11	02-02-11	139d		PS1480, PS1460, PS1470	DS1610, EP3200, EP3400, EP3300, EP3500, EP3700, EP3600, EP1150, EP...
CRB/HI/14 90% Design, PS&E & Reviews			115d	11-08-10	04-20-11	139d			
CRB/HI/14 90% Design & PS&E			75d	11-08-10	02-23-11	139d			
DS1600	5d/Wk ...	CRB/HI/14 90% Design Development	30d	11-08-10	12-20-10	149d		DS1430	DS1605
DS1605	5d/Wk ...	CRB/HI/14 90% Plan Development	30d	12-07-10	01-19-11	149d		DS1600	DS1610
DS1610	5d/Wk ...	CRB/HI/14 90% Plans READY FOR REVIEW	0d		02-02-11	139d		DS1605, PS1490	DS1620
DS1620	5d/Wk ...	CRB/HI/14 90% QA/QC Internal	10d	02-03-11	02-16-11	139d		DS1610	DS1630
DS1630	5d/Wk ...	CRB/HI/14 90% Reconcile Comments (Internal)	5d	02-17-11	02-23-11	139d		DS1620	PS1660, PS1670, CR1650, PS1680, DS1800
CRB/HI/14 90% Constructibility Review			10d	02-24-11	03-09-11	139d			
CR1650	5d/Wk ...	CRB/HI/14 90% Constructability Review	10d	02-24-11	03-09-11	139d		DS1630	PS1660, PS1670, PS1680
CRB/HI/14 90% PS&E Reviews			30d	03-10-11	04-20-11	139d			
PS1660	5d/Wk ...	CRB/HI/14 90% PS&E - Region & Transit Review	20d	03-10-11	04-06-11	139d		DS1630, CR1650	PS1690
PS1670	5d/Wk ...	CRB/HI/14 90% PS&E - Local Agency Review	20d	03-10-11	04-06-11	139d		DS1630, CR1650	PS1690
PS1680	5d/Wk ...	CRB/HI/14 90% PS&E - State & Federal Review	20d	03-10-11	04-06-11	139d		DS1630, CR1650	PS1690
PS1690	5d/Wk ...	CRB/HI/14 90% PS&E - Reconcile Comments (Reg/Tran/Local/State/Fed)	10d	04-07-11	04-20-11	139d		PS1680, PS1660, PS1670	DS1810
CRB/HI/14 100% Design, PS&E & Reviews			204d	02-24-11	12-12-11	111d			
CRB/HI/14 100% Design & PS&E			55d	02-24-11	05-11-11	139d			
DS1800	5d/Wk ...	CRB/HI/14 100% Design Development	20d	02-24-11	03-23-11	149d		DS1630	DS1805
DS1805	5d/Wk ...	CRB/HI/14 100% Plan Development	20d	03-10-11	04-06-11	149d		DS1800	DS1810
DS1810	5d/Wk ...	CRB/HI/14 100% Plans READY FOR REVIEW	0d		04-20-11	139d		DS1805, PS1690	DS1820
DS1820	5d/Wk ...	CRB/HI/14 100% QA/QC Internal	10d	04-21-11	05-04-11	139d		DS1810	DS1830
DS1830	5d/Wk ...	CRB/HI/14 100% Reconcile Comments (Internal)	5d	05-05-11	05-11-11	139d		DS1820	PS1860, PS1870, CR1850, PS1880
CRB/HI/14 100% Constructibility Review			5d	10-24-11	10-28-11	25d			
CR1850	5d/Wk ...	CRB/HI/14 100% Constructability Review	5d	10-24-11	10-28-11	25d		DS1830, ST1850	PS1860, PS1870, PS1880, DS6100
CRB/HI/14 100% PS&E Reviews			30d	10-31-11	12-12-11	111d			
PS1860	5d/Wk ...	CRB/HI/14 100% PS&E - Region & Transit Review	20d	10-31-11	11-28-11	111d		DS1830, CR1850	PS1890
PS1870	5d/Wk ...	CRB/HI/14 100% PS&E - Local Agency Review	20d	10-31-11	11-28-11	111d		DS1830, CR1850	PS1890
PS1880	5d/Wk ...	CRB/HI/14 100% PS&E - State & Federal Review	20d	10-31-11	11-28-11	111d		DS1830, CR1850	PS1890
PS1890	5d/Wk ...	CRB/HI/14 100% PS&E - Reconcile Comments (Reg/Tran/Local/State/Fed)	10d	11-29-11	12-12-11	111d		PS1880, PS1860, PS1870	PS1900
PS1900	5d/Wk ...	CRB/HI/14 100% PS&E - Design Package Complete	0d		12-12-11	111d		PS1890, ST1900	AA1110
MD Design / PS&E / Reviews			582d	03-22-10	06-29-12	288d			
MD Initial Design, PS&E & Reviews			160d	03-22-10	11-03-10	288d			
MD Initial Design & PS&E			70d	03-22-10	06-28-10	288d			
DS5100	5d/Wk ...	MD Initial Design Development	35d	03-22-10	05-07-10	288d		SW1500, AL1220, TC1500, RD1500, TD1500, DD1600	DS5105, ST5100
DS5105	5d/Wk ...	MD Initial Plan Development	35d	04-19-10	06-07-10	288d		DS5100	DS5110
DS5110	5d/Wk ...	MD Initial Plans READY FOR REVIEW	0d		06-07-10	288d		DS5105	DS5120
DS5120	5d/Wk ...	MD Initial QA/QC Internal	10d	06-08-10	06-21-10	288d		DS5110	DS5130
DS5130	5d/Wk ...	MD Initial Reconcile Comments (Internal)	5d	06-22-10	06-28-10	288d		DS5120	CR5150, PS5160, PS5170
MD Initial Constructibility Review			20d	06-29-10	07-27-10	288d			
CR5150	5d/Wk ...	MD Initial Constructability Review	20d	06-29-10	07-27-10	288d		DS5130	PS5160, PS5170
MD Initial PS&E Reviews			70d	07-28-10	11-03-10	288d			
PS5160	5d/Wk ...	MD Initial PS&E - Region Review	20d	07-28-10	08-24-10	288d		DS5130, CR5150	PS5175
PS5170	5d/Wk ...	MD Initial PS&E - Local Agency Review	20d	07-28-10	08-24-10	288d		DS5130, CR5150	PS5175
PS5175	5d/Wk ...	MD Initial PS&E - Reconcile Comments (Region/Local)	10d	08-25-10	09-08-10	288d		PS5160, PS5170	PS5180, PS5190
PS5180	5d/Wk ...	MD Initial PS&E - State & Federal Review	20d	09-09-10	10-06-10	288d		PS5175	PS5190
PS5190	5d/Wk ...	MD Initial PS&E - Reconcile Comments (State/Federal)	20d	10-07-10	11-03-10	288d		PS5180, PS5175	DS5400
MD 60% Design, PS&E & Reviews			167d	11-04-10	06-30-11	288d			
MD 60% Design & PS&E			77d	11-04-10	02-23-11	288d			
DS5400	5d/Wk ...	MD 60% Design Development	42d	11-04-10	01-05-11	288d		PS5190, EN4900	DS5405
DS5405	5d/Wk ...	MD 60% Plan Development	42d	12-03-10	02-02-11	288d		DS5400	DS5410
DS5410	5d/Wk ...	MD 60% Plans READY FOR REVIEW	0d		02-02-11	288d		DS5405	DS5420
DS5420	5d/Wk ...	MD 60% QA/QC Internal	10d	02-03-11	02-16-11	288d		DS5410	DS5430
DS5430	5d/Wk ...	MD 60% Reconcile Comments (Internal)	5d	02-17-11	02-23-11	288d		DS5420	PS5460, PS5470, CR5450
MD 60% Constructibility Review			20d	02-24-11	03-23-11	288d			
CR5450	5d/Wk ...	MD 60% Constructabiltiy Review	20d	02-24-11	03-23-11	288d		DS5430	PS5460, PS5470
MD 60% PS&E Reviews			70d	03-24-11	06-30-11	288d			
PS5460	5d/Wk ...	MD 60% PS&E - Region Review	20d	03-24-11	04-20-11	288d		DS5430, CR5450	PS5475
PS5470	5d/Wk ...	MD 60% PS&E - Local Agency Review	20d	03-24-11	04-20-11	288d		DS5430, CR5450	PS5475
PS5475	5d/Wk ...	MD 60% PS&E - Reconcile Comments (Region/Local)	10d	04-21-11	05-04-11	288d		PS5460, PS5470	PS5480, PS5490
PS5480	5d/Wk ...	MD 60% PS&E - State & Federal Review	20d	05-05-11	06-02-11	288d		PS5475	PS5490
PS5490	5d/Wk ...	MD 60% PS&E - Reconcile Comments (State/Federal)	20d	06-03-11	06-30-11	288d		PS5480, PS5475	DS5600
MD 90% Design, PS&E & Reviews			145d	07-01-11	01-26-12	288d			
MD 90% Design & PS&E			65d	07-01-11	10-03-11	288d			

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
DS5600	5d/Wk ...	MD 90% Design Development	30d	07-01-11	08-12-11	288d		PS5490	DS5605
DS5605	5d/Wk ...	MD 90% Plan Development	30d	08-01-11	09-12-11	288d		DS5600	DS5610
DS5610	5d/Wk ...	MD 90% Plans READY FOR REVIEW	0d		09-12-11	288d		DS5605	DS5620
DS5620	5d/Wk ...	MD 90% QA/QC Internal	10d	09-13-11	09-26-11	288d		DS5610	DS5630
DS5630	5d/Wk ...	MD 90% Reconcile Comments (Internal)	5d	09-27-11	10-03-11	288d		DS5620	PS5660, PS5670, CR5650
MD 90% Constructibility Review			10d	10-04-11	10-17-11	288d			
CR5650	5d/Wk ...	MD 90% Constructability Review	10d	10-04-11	10-17-11	288d		DS5630	PS5660, PS5670
MD 90% PS&E Reviews			70d	10-18-11	01-26-12	288d			
PS5660	5d/Wk ...	MD 90% PS&E - Region Review	20d	10-18-11	11-14-11	288d		DS5630, CR5650	PS5675
PS5670	5d/Wk ...	MD 90% PS&E - Local Agency Review	20d	10-18-11	11-14-11	288d		DS5630, CR5650	PS5675
PS5675	5d/Wk ...	MD 90% PS&E - Reconcile Comments (Region/Local)	20d	11-15-11	12-13-11	288d		PS5660, PS5670	PS5680, PS5690
PS5680	5d/Wk ...	MD 90% PS&E - State & Federal Review	20d	12-14-11	01-12-12	288d		PS5675	PS5690
PS5690	5d/Wk ...	MD 90% PS&E - Reconcile Comments (State/Federal)	10d	01-13-12	01-26-12	288d		PS5680, PS5675	DS5800
MD 100% Design, PS&E & Reviews			110d	01-27-12	06-29-12	288d			
MD 100% Design & PS&E			45d	01-27-12	03-29-12	288d			
DS5800	5d/Wk ...	MD 100% Design Development	20d	01-27-12	02-23-12	288d		PS5690	DS5805
DS5805	5d/Wk ...	MD 100% Plan Development	20d	02-10-12	03-08-12	288d		DS5800	DS5810
DS5810	5d/Wk ...	MD 100% Plans READY FOR REVIEW	0d		03-08-12	288d		DS5805	DS5820
DS5820	5d/Wk ...	MD 100% QA/QC Internal	10d	03-09-12	03-22-12	288d		DS5810	DS5830
DS5830	5d/Wk ...	MD 100% Reconcile Comments (Internal)	5d	03-23-12	03-29-12	288d		DS5820	PS5860, PS5870, CR5850
MD 100% Constructibility Review			5d	03-30-12	04-05-12	288d			
CR5850	5d/Wk ...	MD 100% Constructability Review	5d	03-30-12	04-05-12	288d		DS5830, ST5850	PS5860, PS5870
MD 100% PS&E Reviews			60d	04-06-12	06-29-12	288d			
PS5860	5d/Wk ...	MD 100% PS&E - Region Review	20d	04-06-12	05-03-12	288d		DS5830, CR5850	PS5875
PS5870	5d/Wk ...	MD 100% PS&E - Local Agency Review	20d	04-06-12	05-03-12	288d		DS5830, CR5850	PS5875
PS5875	5d/Wk ...	MD 100% PS&E - Reconcile Comments (Region/Local)	10d	05-04-12	05-17-12	288d		PS5860, PS5870	PS5880, PS5890
PS5880	5d/Wk ...	MD 100% PS&E - State & Federal Review	20d	05-18-12	06-15-12	288d		PS5875	PS5890
PS5890	5d/Wk ...	MD 100% PS&E - Reconcile Comments (State/Federal)	10d	06-18-12	06-29-12	288d		PS5880, PS5875	PS5900
PS5900	5d/Wk ...	MD 100% PS&E - Design Package Complete	0d		06-29-12	288d		PS5890, ST5900	AA1410
500/MP/FP Design / PS&E / Reviews			726d	10-31-11	09-04-14	25d			
500/MP/FP Initial Design, PS&E & Reviews			192d	10-31-11	07-31-12	25d			
500/MP/FP Initial Design & PS&E			82d	10-31-11	02-24-12	25d			
DS6100	5d/Wk ...	500/MP/FP Initial Design Development	42d	10-31-11	12-29-11	25d		TC1140, EN4900, SW1800, DD1800, TC1800, RD1800, TD1800, CR1850	DS6105, ST6100
DS6105	5d/Wk ...	500/MP/FP Initial Plan Development	42d	11-29-11	01-27-12	25d		DS6100	DS6110
DS6110	5d/Wk ...	500/MP/FP Initial Plans READY FOR REVIEW	0d		01-27-12	25d		DS6105	DS6120
DS6120	5d/Wk ...	500/MP/FP Initial QA/QC Internal	10d	01-30-12	02-10-12	25d		DS6110	DS6130
DS6130	5d/Wk ...	500/MP/FP Initial Reconcile Comments (Internal)	10d	02-13-12	02-24-12	25d		DS6120	CR6150, PS6160, PS6170
500/MP/FP Initial Constructibility Review			30d	02-27-12	04-06-12	25d			
CR6150	5d/Wk ...	500/MP/FP Initial Constructability Review	30d	02-27-12	04-06-12	25d		DS6130	PS6160, PS6170
500/MP/FP Initial PS&E Reviews			80d	04-09-12	07-31-12	25d			
PS6160	5d/Wk ...	500/MP/FP Initial PS&E - Region Review	20d	04-09-12	05-04-12	25d		DS6130, CR6150, RD1110, RD1140	PS6175
PS6170	5d/Wk ...	500/MP/FP Initial PS&E - Local Agency Review	20d	04-09-12	05-04-12	25d		DS6130, CR6150	PS6175
PS6175	5d/Wk ...	500/MP/FP Initial PS&E - Reconcile Comments (Region/Local)	10d	05-07-12	05-18-12	25d		PS6160, PS6170	PS6180, PS6190
PS6180	5d/Wk ...	500/MP/FP Initial PS&E - State & Federal Review	30d	05-21-12	07-02-12	25d		PS6175	PS6190
PS6190	5d/Wk ...	500/MP/FP Initial PS&E - Reconcile Comments (State/Federal)	20d	07-03-12	07-31-12	25d		PS6180, PS6175	DS6400
500/MP/FP 60% Design, PS&E & Reviews			222d	08-01-12	06-13-13	25d			
500/MP/FP 60% Design & PS&E			100d	08-01-12	12-20-12	25d			
DS6400	5d/Wk ...	500/MP/FP 60% Design Development	60d	08-01-12	10-24-12	25d		PS6190, EP0500	DS6405, EP3800
DS6405	5d/Wk ...	500/MP/FP 60% Plan Development	60d	08-29-12	11-21-12	25d		DS6400	DS6410
DS6410	5d/Wk ...	500/MP/FP 60% Plans READY FOR REVIEW	0d		11-21-12	25d		DS6405, SW2280	DS6420
DS6420	5d/Wk ...	500/MP/FP 60% QA/QC Internal	10d	11-23-12	12-06-12	25d		DS6410	DS6430
DS6430	5d/Wk ...	500/MP/FP 60% Reconcile Comments (Internal)	10d	12-07-12	12-20-12	25d		DS6420	PS6460, PS6470, CR6450
500/MP/FP 60% Constructibility Review			42d	12-21-12	02-20-13	25d			
CR6450	5d/Wk ...	500/MP/FP 60% Constructabiltiy Review	42d	12-21-12	02-20-13	25d		DS6430	PS6460, PS6470
500/MP/FP 60% PS&E Reviews			80d	02-21-13	06-13-13	25d			
PS6460	5d/Wk ...	500/MP/FP 60% PS&E - Region Review	20d	02-21-13	03-20-13	25d		DS6430, CR6450	PS6475
PS6470	5d/Wk ...	500/MP/FP 60% PS&E - Local Agency Review	20d	02-21-13	03-20-13	25d		DS6430, CR6450	PS6475
PS6475	5d/Wk ...	500/MP/FP 60% PS&E - Reconcile Comments (Region/Local)	10d	03-21-13	04-03-13	25d		PS6460, PS6470	PS6480, PS6490
PS6480	5d/Wk ...	500/MP/FP 60% PS&E - State & Federal Review	30d	04-04-13	05-15-13	25d		PS6475	PS6490
PS6490	5d/Wk ...	500/MP/FP 60% PS&E - Reconcile Comments (State/Federal)	20d	05-16-13	06-13-13	25d		PS6480, PS6475	DS6600, EP4700, EP4600
500/MP/FP 90% Design, PS&E & Reviews			192d	06-14-13	03-17-14	25d			
500/MP/FP 90% Design & PS&E			82d	06-14-13	10-09-13	25d			
DS6600	5d/Wk ...	500/MP/FP 90% Design Development	42d	06-14-13	08-13-13	25d		PS6490	DS6605
DS6605	5d/Wk ...	500/MP/FP 90% Plan Development	42d	07-15-13	09-11-13	25d		DS6600	DS6610
DS6610	5d/Wk ...	500/MP/FP 90% Plans READY FOR REVIEW	0d		09-11-13	25d		DS6605	DS6620
DS6620	5d/Wk ...	500/MP/FP 90% QA/QC Internal	10d	09-12-13	09-25-13	25d		DS6610	DS6630
DS6630	5d/Wk ...	500/MP/FP 90% Reconcile Comments (Internal)	10d	09-26-13	10-09-13	25d		DS6620	PS6660, PS6670, CR6650
500/MP/FP 90% Constructibility Review			20d	10-10-13	11-06-13	25d			
CR6650	5d/Wk ...	500/MP/FP 90% Constructability Review	20d	10-10-13	11-06-13	25d		DS6630	PS6660, PS6670
500/MP/FP 90% PS&E Reviews			90d	11-07-13	03-17-14	25d			
PS6660	5d/Wk ...	500/MP/FP 90% PS&E - Region Review	20d	11-07-13	12-05-13	25d		DS6630, CR6650	PS6675
PS6670	5d/Wk ...	500/MP/FP 90% PS&E - Local Agency Review	20d	11-07-13	12-05-13	25d		DS6630, CR6650	PS6675
PS6675	5d/Wk ...	500/MP/FP 90% PS&E - Reconcile Comments (Region/Local)	20d	12-06-13	01-06-14	25d		PS6660, PS6670	PS6680, PS6690
PS6680	5d/Wk ...	500/MP/FP 90% PS&E - State & Federal Review	30d	01-07-14	02-17-14	25d		PS6675	PS6690
PS6690	5d/Wk ...	500/MP/FP 90% PS&E - Reconcile Comments (State/Federal)	20d	02-18-14	03-17-14	25d		PS6680, PS6675	DS6800
500/MP/FP 100% Design, PS&E & Reviews			120d	03-18-14	09-04-14	25d			
500/MP/FP 100% Design & PS&E			50d	03-18-14	05-27-14	25d			
DS6800	5d/Wk ...	500/MP/FP 100% Design Development	20d	03-18-14	04-14-14	25d		PS6690	DS6805
DS6805	5d/Wk ...	500/MP/FP 100% Plan Development	20d	04-01-14	04-28-14	25d		DS6800	DS6810
DS6810	5d/Wk ...	500/MP/FP 100% Plans READY FOR REVIEW	0d		04-28-14	25d		DS6805	DS6820

Columbia River CROSSING

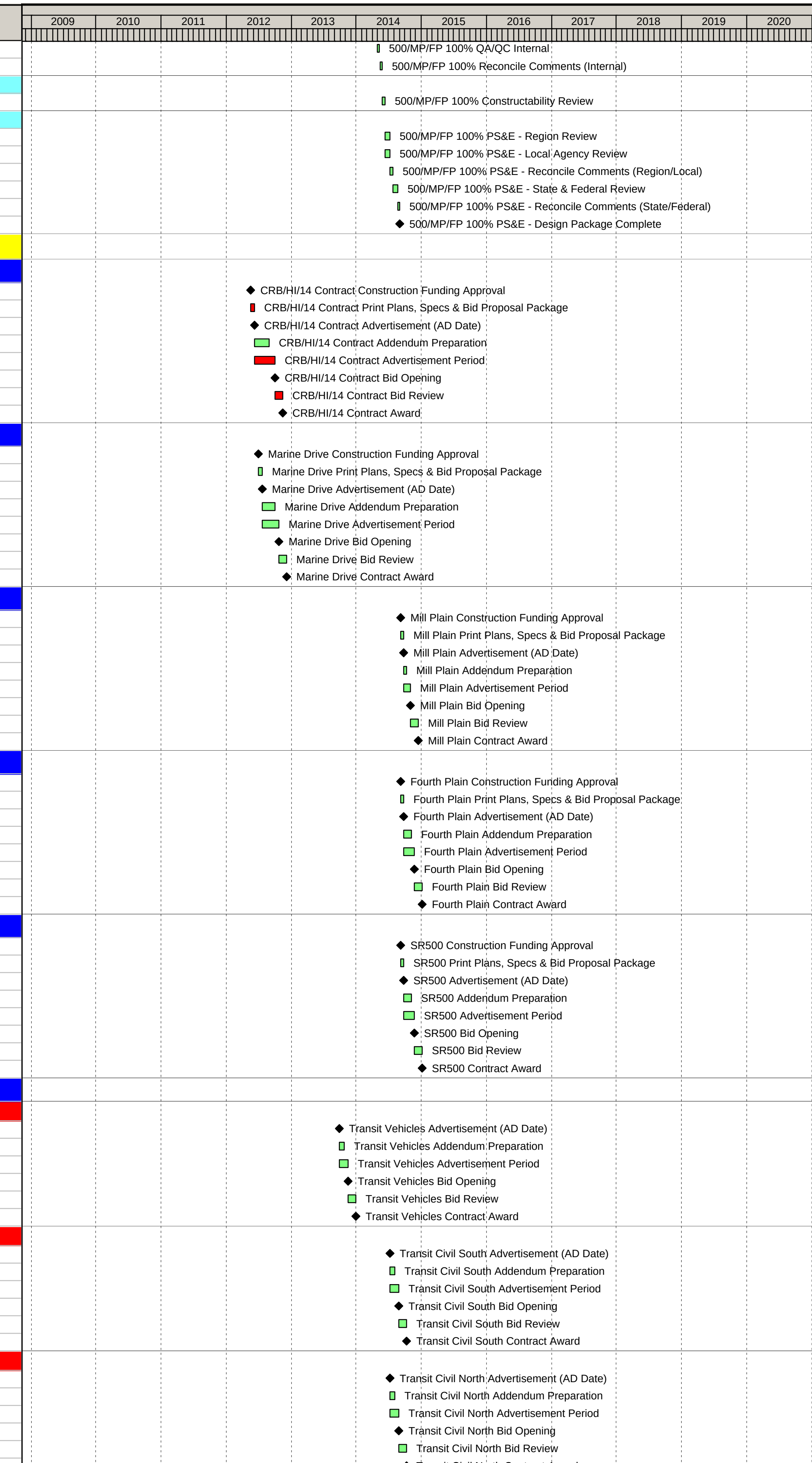
Remaining Work | Critical Remaining Work | Actual Work | Remaining Level of Effort | Milestone

Data Date: 09-01-08

Print Date/Time: 05-28-09 12:10

CRC Project Schedule (Baseline w/ current data through 4/22/09)

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
DS6820	5d/Wk ...	500/MP/FP 100% QA/QC Internal	10d	04-29-14	05-12-14	25d		DS6810	DS6830
DS6830	5d/Wk ...	500/MP/FP 100% Reconcile Comments (Internal)	10d	05-13-14	05-27-14	25d		DS6820	PS6860, PS6870, CR6850
500/MP/FP 100% Constructibility Review			10d	05-28-14	06-10-14	25d			
CR6850	5d/Wk ...	500/MP/FP 100% Constructability Review	10d	05-28-14	06-10-14	25d		DS6830, ST6850	PS6860, PS6870
500/MP/FP 100% PS&E Reviews			60d	06-11-14	09-04-14	25d			
PS6860	5d/Wk ...	500/MP/FP 100% PS&E - Region Review	20d	06-11-14	07-09-14	25d		DS6830, CR6850	PS6875
PS6870	5d/Wk ...	500/MP/FP 100% PS&E - Local Agency Review	20d	06-11-14	07-09-14	25d		DS6830, CR6850	PS6875
PS6875	5d/Wk ...	500/MP/FP 100% PS&E - Reconcile Comments (Region/Local)	10d	07-10-14	07-23-14	25d		PS6860, PS6870	PS6880, PS6890
PS6880	5d/Wk ...	500/MP/FP 100% PS&E - State & Federal Review	20d	07-24-14	08-20-14	25d		PS6875	PS6890
PS6890	5d/Wk ...	500/MP/FP 100% PS&E - Reconcile Comments (State/Federal)	10d	08-21-14	09-04-14	25d		PS6880, PS6875	PS6900
PS6900	5d/Wk ...	500/MP/FP 100% PS&E - Design Package Complete	0d		09-04-14	25d		PS6890, ST6900	AA1610, AA1510, AA1710
CONTRACT AD & AWARD			118...	05-18-12	01-06-17	79d			
CRB/HI/14 Ad & Award			125d	05-18-12	11-13-12	0d			
AA1110	5d/Wk ...	CRB/HI/14 Contract Construction Funding Approval	0d	05-18-12		0d		UT2000, EP3250, EP3450, EP3350, EP3550, EP3650, EP1200, EP1600, E...	AA1115
AA1115	5d/Wk ...	CRB/HI/14 Contract Print Plans, Specs & Bid Proposal Package	15d	05-18-12	06-08-12	0d		AA1110	AA1120
AA1120	5d/Wk ...	CRB/HI/14 Contract Advertisement (AD Date)	0d	06-11-12		0d		AA1115, SW2300	AA1130
AA1125	5d/Wk ...	CRB/HI/14 Contract Addendum Preparation	56d	06-11-12	08-28-12	10d		AA1130	AA1135
AA1130	5d/Wk ...	CRB/HI/14 Contract Advertisement Period	80d	06-11-12	10-02-12	0d		AA1120	AA1125, AA1135
AA1135	5d/Wk ...	CRB/HI/14 Contract Bid Opening	0d		10-02-12	0d		AA1130, AA1125	AA1140
AA1140	5d/Wk ...	CRB/HI/14 Contract Bid Review	30d	10-03-12	11-13-12	0d		AA1135	AA1145
AA1145	5d/Wk ...	CRB/HI/14 Contract Award	0d		11-13-12	0d		AA1140	RB1010
Marine Drive Ad & Award			110d	07-02-12	12-05-12	288d			
AA1410	5d/Wk ...	Marine Drive Construction Funding Approval	0d	07-02-12		288d		UT2000, EP3250, EP3450, EP2000, EP1900, EP2800, PS5900, EP3750, E...	AA1415
AA1415	5d/Wk ...	Marine Drive Print Plans, Specs & Bid Proposal Package	15d	07-02-12	07-23-12	288d		AA1410	AA1420
AA1420	5d/Wk ...	Marine Drive Advertisement (AD Date)	0d	07-24-12		288d		AA1415, SW2300	AA1430
AA1425	5d/Wk ...	Marine Drive Addendum Preparation	51d	07-24-12	10-03-12	288d		AA1430	AA1435
AA1430	5d/Wk ...	Marine Drive Advertisement Period	65d	07-24-12	10-23-12	288d		AA1420	AA1425, AA1435
AA1435	5d/Wk ...	Marine Drive Bid Opening	0d		10-23-12	288d		AA1430, AA1425	AA1440
AA1440	5d/Wk ...	Marine Drive Bid Review	30d	10-24-12	12-05-12	288d		AA1435	AA1445
AA1445	5d/Wk ...	Marine Drive Contract Award	0d		12-05-12	288d		AA1440	MD1010
Mill Plain Ad & Award			70d	09-05-14	12-12-14	131d			
AA1510	5d/Wk ...	Mill Plain Construction Funding Approval	0d	09-05-14		131d		PS6900, UT2000, EP3650, EP1000, EP0600, EP0700, EP0800, EP0900, E...	AA1515
AA1515	5d/Wk ...	Mill Plain Print Plans, Specs & Bid Proposal Package	15d	09-05-14	09-25-14	131d		AA1510	AA1520
AA1520	5d/Wk ...	Mill Plain Advertisement (AD Date)	0d	09-26-14		131d		AA1515, SW2300	AA1530
AA1525	5d/Wk ...	Mill Plain Addendum Preparation	11d	09-26-14	10-10-14	131d		AA1530	AA1535
AA1530	5d/Wk ...	Mill Plain Advertisement Period	25d	09-26-14	10-30-14	131d		AA1520	AA1525, AA1535
AA1535	5d/Wk ...	Mill Plain Bid Opening	0d		10-30-14	131d		AA1530, AA1525	AA1540
AA1540	5d/Wk ...	Mill Plain Bid Review	30d	10-31-14	12-12-14	131d		AA1535	AA1545
AA1545	5d/Wk ...	Mill Plain Contract Award	0d		12-12-14	131d		AA1540	MP1010
Fourth Plain Ad & Award			87d	09-05-14	01-08-15	349d			
AA1610	5d/Wk ...	Fourth Plain Construction Funding Approval	0d	09-05-14		349d		PS6900, UT2000, EP3650, EP1000, EP0100, EP0600, EP0700, EP0800, E...	AA1615
AA1615	5d/Wk ...	Fourth Plain Print Plans, Specs & Bid Proposal Package	15d	09-05-14	09-25-14	349d		AA1610	AA1620
AA1620	5d/Wk ...	Fourth Plain Advertisement (AD Date)	0d	09-26-14		349d		AA1615, SW2300	AA1630
AA1625	5d/Wk ...	Fourth Plain Addendum Preparation	28d	09-26-14	11-04-14	349d		AA1630	AA1635
AA1630	5d/Wk ...	Fourth Plain Advertisement Period	42d	09-26-14	11-24-14	349d		AA1620	AA1625, AA1635
AA1635	5d/Wk ...	Fourth Plain Bid Opening	0d		11-24-14	349d		AA1630, AA1625	AA1640
AA1640	5d/Wk ...	Fourth Plain Bid Review	30d	11-25-14	01-08-15	349d		AA1635	AA1645
AA1645	5d/Wk ...	Fourth Plain Contract Award	0d		01-08-15	349d		AA1640	4P1010
SR500 Ad & Award			87d	09-05-14	01-08-15	25d			
AA1710	5d/Wk ...	SR500 Construction Funding Approval	0d	09-05-14		25d		PS6900, UT2000, EP3250, EP3350, EP3650, EP1600, EP1000, EP3800, E...	AA1715
AA1715	5d/Wk ...	SR500 Print Plans, Specs & Bid Proposal Package	15d	09-05-14	09-25-14	25d		AA1710	AA1720
AA1720	5d/Wk ...	SR500 Advertisement (AD Date)	0d	09-26-14		25d		AA1715, SW2300	AA1730
AA1725	5d/Wk ...	SR500 Addendum Preparation	28d	09-26-14	11-04-14	25d		AA1730	AA1735
AA1730	5d/Wk ...	SR500 Advertisement Period	42d	09-26-14	11-24-14	25d		AA1720	AA1725, AA1735
AA1735	5d/Wk ...	SR500 Bid Opening	0d		11-24-14	25d		AA1730, AA1725	AA1740
AA1740	5d/Wk ...	SR500 Bid Review	30d	11-25-14	01-08-15	25d		AA1735	AA1745
AA1745	5d/Wk ...	SR500 Contract Award	0d		01-08-15	25d		AA1740	5H1010
Transit Ad & Award			835d	09-27-13	01-06-17	79d			
Transit Vehicle Procurement			65d	09-27-13	12-30-13	40d			
AA2120	5d/Wk ...	Transit Vehicles Advertisement (AD Date)	0d	09-27-13		40d		TR5600, TR5380	AA2130
AA2125	5d/Wk ...	Transit Vehicles Addendum Preparation	21d	09-27-13	10-25-13	54d		AA2130	AA2135
AA2130	5d/Wk ...	Transit Vehicles Advertisement Period	35d	09-27-13	11-14-13	40d		AA2120	AA2125, AA2135
AA2135	5d/Wk ...	Transit Vehicles Bid Opening	0d		11-14-13	40d		AA2125, AA2130	AA2140
AA2140	5d/Wk ...	Transit Vehicles Bid Review	30d	11-15-13	12-30-13	40d		AA2135	AA2145
AA2145	5d/Wk ...	Transit Vehicles Contract Award	0d		12-30-13	40d		AA2140	TR7500
Transit Civil - South (Oregon & CRC Bridge)			65d	07-11-14	10-10-14	13d			
AA2220	5d/Wk ...	Transit Civil South Advertisement (AD Date)	0d	07-11-14		13d		TR5500, TR5600, SW2300, EP3150, EP3250, EP3450, EP3750, EP0100, E...	AA2230
AA2225	5d/Wk ...	Transit Civil South Addendum Preparation	21d	07-11-14	08-08-14	27d		AA2230	AA2235
AA2230	5d/Wk ...	Transit Civil South Advertisement Period	35d	07-11-14	08-28-14	13d		AA2220	AA2225, AA2235
AA2235	5d/Wk ...	Transit Civil South Bid Opening	0d		08-28-14	13d		AA2225, AA2230	AA2240
AA2240	5d/Wk ...	Transit Civil South Bid Review	30d	08-29-14	10-10-14	13d		AA2235	AA2245
AA2245	5d/Wk ...	Transit Civil South Contract Award	0d		10-10-14	13d		AA2240	TR8000, TR8400, TR8200, TR8300, TR8500, TR7600, TR8100
Transit Civil - North (Washington)			65d	07-11-14	10-10-14	13d			
AA2420	5d/Wk ...	Transit Civil North Advertisement (AD Date)	0d	07-11-14		13d		TR5500, TR5600, SW2300, EP3650, EP0100, EP1600, EP0500, EP0600, E...	AA2430
AA2425	5d/Wk ...	Transit Civil North Addendum Preparation	21d	07-11-14	08-08-14	27d		AA2430	AA2435
AA2430	5d/Wk ...	Transit Civil North Advertisement Period	35d	07-11-14	08-28-14	13d		AA2420	AA2425, AA2435
AA2435	5d/Wk ...	Transit Civil North Bid Opening	0d		08-28-14	13d		AA2425, AA2430	AA2440
AA2440	5d/Wk ...	Transit Civil North Bid Review	30d	08-29-14	10-10-14	13d		AA2435	AA2445
AA2445	5d/Wk ...	Transit Civil North Contract Award	0d		10-10-14	13d		AA2440	TR7700, TR7800, TR7900, TR8600, TR7600, TR9500



Remaining Work | Critical Remaining Work | Actual Work

Remaining Level of Effort | Milestone

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
Transit Park & Rides			65d	04-23-15	07-24-15	97d			
AA2620	5d/Wk ...	Transit P&R Advertisement (AD Date)	0d	04-23-15		97d		TR5600	AA2630
AA2625	5d/Wk ...	Transit P&R Addendum Preparation	21d	04-23-15	05-21-15	111d		AA2630	AA2635
AA2630	5d/Wk ...	Transit P&R Advertisement Period	35d	04-23-15	06-11-15	97d		AA2620	AA2625, AA2635
AA2635	5d/Wk ...	Transit P&R Bid Opening	0d		06-11-15	97d		AA2625, AA2630	AA2640
AA2640	5d/Wk ...	Transit P&R Bid Review	30d	06-12-15	07-24-15	97d		AA2635	AA2645
AA2645	5d/Wk ...	Transit P&R Contract Award	0d		07-24-15	97d		AA2640	TR8600, TR8700, TR8800
Transit Systems			65d	02-05-16	05-05-16	34d			
AA2720	5d/Wk ...	Transit Systems Advertisement (AD Date)	0d	02-05-16		34d		TR5600	AA2730
AA2725	5d/Wk ...	Transit Systems Addendum Preparation	21d	02-05-16	03-04-16	48d		AA2730	AA2735
AA2730	5d/Wk ...	Transit Systems Advertisement Period	35d	02-05-16	03-24-16	34d		AA2720	AA2725, AA2735
AA2735	5d/Wk ...	Transit Systems Bid Opening	0d		03-24-16	34d		AA2725, AA2730	AA2740
AA2740	5d/Wk ...	Transit Systems Bid Review	30d	03-25-16	05-05-16	34d		AA2735	AA2745
AA2745	5d/Wk ...	Transit Systems Contract Award	0d		05-05-16	34d		AA2740	TR8980, TR8900, TR8940, TR9020, TR9060, TR9100, TR9140, TR9320, TR...
Transit Maintenance Facility			65d	05-27-16	08-29-16	21d			
AA2820	5d/Wk ...	Transit Maintenance Facility Advertisement (AD Date)	0d	05-27-16		21d		TR5600	AA2830
AA2825	5d/Wk ...	Transit Maintenance Facility Addendum Preparation	21d	05-27-16	06-27-16	35d		AA2830	AA2835
AA2830	5d/Wk ...	Transit Maintenance Facility Advertisement Period	35d	05-27-16	07-18-16	21d		AA2820	AA2825, AA2835
AA2835	5d/Wk ...	Transit Maintenance Facility Bid Opening	0d		07-18-16	21d		AA2825, AA2830	AA2840
AA2840	5d/Wk ...	Transit Maintenance Facility Bid Review	30d	07-19-16	08-29-16	21d		AA2835	AA2845
AA2845	5d/Wk ...	Transit Maintenance Facility Contract Award	0d		08-29-16	21d		AA2840	TR9400
Transit Station Finishes			65d	10-05-16	01-06-17	79d			
AA2920	5d/Wk ...	Transit Station Finishes Advertisement (AD Date)	0d	10-05-16		79d		TR5600	AA2930
AA2925	5d/Wk ...	Transit Station Finishes Addendum Preparation	21d	10-05-16	11-02-16	93d		AA2930	AA2935
AA2930	5d/Wk ...	Transit Station Finishes Advertisement Period	35d	10-05-16	11-22-16	79d		AA2920	AA2925, AA2935
AA2935	5d/Wk ...	Transit Station Finishes Bid Opening	0d		11-22-16	79d		AA2925, AA2930	AA2940
AA2940	5d/Wk ...	Transit Station Finishes Bid Review	30d	11-23-16	01-06-17	79d		AA2935	AA2945
AA2945	5d/Wk ...	Transit Station Finishes Contract Award	0d		01-06-17	79d		AA2940	TR9500, TR9540, TR9620, TR9660, TR9580, TR9700, TR9740
CONSTRUCTION			162...	11-14-12	04-04-19	0d			
Construction Admin			158...	01-16-13	04-04-19	0d			
Construction Admin			158...	01-16-13	04-04-19	0d			
CN1010	5d/Wk ...	Begin Construction	0d	01-16-13		1585d		RB1020	EN8800, AR8100, CN1020, EN8900
CN1020	5d/Wk ...	Construction Period	158...	01-16-13	04-04-19	0d		CN1010	CN1030
CN1030	5d/Wk ...	End Construction	0d		04-04-19	0d		CN1020, EN8800, AR8100, RB2030, 5H1820, AR2100, 4P1350, 141850, Hi...	
Environmental			158...	01-16-13	04-04-19	0d			
EN8800	5d/Wk ...	Environmental Mitigation Commitment Tracking	158...	01-16-13	04-04-19	0d		CN1010	CN1030
AR8100	5d/Wk ...	Archaeological Monitoring	158...	01-16-13	04-04-19	0d		CN1010	CN1030
EN8900	5d/Wk ...	Model Toxics Control Act (MTCA) Coordination	158...	01-16-13	04-04-19	0d		CN1010	CN1030
CRB/HI/14 Construction			162...	11-14-12	04-04-19	0d			
CRB/HI/14 General			42d	11-14-12	01-15-13	0d			
RB1010	5d/Wk ...	CRB/HI/14 Contract Execution Period	42d	11-14-12	01-15-13	0d		AA1145	141020, Hi1020, RB1020
Columbia River Bridge Construction			940d	01-16-13	09-21-16	645d			
RB1020	5d/Wk ...	Columbia River Bridge Mobilization	130d	01-16-13	07-18-13	0d		RB1010, EP4100, EP4200	RB1060, CN1010, RB1960
P2			275d	07-19-13	08-15-14	245d			
RB1060	5d/Wk ...	Move large barge to P2 & Install Temporary Piles	10d	07-19-13	08-01-13	0d		RB1020	RB1070, RB1080
RB1070	5d/Wk ...	Install NB shafts, clean-out, install reinf., place conc.	80d	08-02-13	11-22-13	0d		RB1060	RB1190, RB1200, RB1090
RB1080	5d/Wk ...	Install SB shafts, clean-out, install reinf., place conc.	80d	08-02-13	11-22-13	0d		RB1060	RB1190, RB1200, RB1090
RB1090	5d/Wk ...	Float-in NB precast pile cap	10d	11-11-13	11-22-13	190d		RB1070, RB1080	RB1100
RB1100	5d/Wk ...	FRP NB pile cap	30d	11-25-13	01-08-14	190d		RB1090	RB1110
RB1110	5d/Wk ...	Float-in SB precast pile cap	10d	12-24-13	01-08-14	190d		RB1100	RB1120
RB1120	5d/Wk ...	FRP SB pile cap	30d	01-09-14	02-19-14	190d		RB1110	RB1230, RB1130
RB1130	5d/Wk ...	Install tower crane between NB/SB structures	10d	02-20-14	03-05-14	225d		RB1120	RB1140
RB1140	5d/Wk ...	FRP NB and SB piers	45d	03-06-14	05-07-14	225d		RB1130	RB1260, RB1150
RB1150	5d/Wk ...	FRP NB and SB pier tables	45d	04-24-14	06-26-14	245d		RB1140	RB1160
RB1160	5d/Wk ...	Erect balanced cantilevers	45d	06-13-14	08-15-14	245d		RB1150	RB1280
P1			360d	09-16-13	02-12-15	340d			
RB1190	5d/Wk ...	Install cofferdam	50d	09-16-13	11-22-13	0d		RB1080, RB1070	RB1200
RB1200	5d/Wk ...	Move large barge to P1 & Install Temporary Piles	10d	11-25-13	12-09-13	0d		RB1190, RB1080, RB1070	RB1210, RB1220
RB1210	5d/Wk ...	Install NB shafts, clean-out, install reinf., place conc.	80d	12-10-13	04-02-14	340d		RB1200	RB1310
RB1220	5d/Wk ...	Install SB shafts, clean-out, install reinf., place conc.	80d	12-10-13	04-02-14	0d		RB1200	RB1230, RB1400
RB1230	5d/Wk ...	FRP NB and SB pilecaps	60d	04-03-14	06-26-14	160d		RB1220, RB1120	RB1240, RB1440
RB1240	5d/Wk ...	Remove cofferdam	20d	06-27-14	07-25-14	160d		RB1230	RB1250
RB1250	5d/Wk ...	Install tower crane between NB/SB structures	10d	07-28-14	08-08-14	160d		RB1240	RB1260
RB1260	5d/Wk ...	FRP NB and SB piers	45d	08-11-14	10-13-14	160d		RB1250, RB1140	RB1270, RB1480
RB1270	5d/Wk ...	FRP NB and SB bent caps	45d	09-30-14	12-02-14	180d		RB1260	RB1280
RB1280	5d/Wk ...	Erect backspans	25d	11-18-14	12-23-14	180d		RB1270, RB1160	RB1290, RB1500
RB1290	5d/Wk ...	Cast closure between AP/P1	15d	01-23-15	02-12-15	340d		RB1280, RB1360	RB1990
Approach Piers/Spans (AP)			210d	03-27-14	01-22-15	340d			
RB1310	5d/Wk ...	Drive sheeting, temporarily backfill	60d	03-27-14	06-19-14	340d		RB1210	RB1320
RB1320	5d/Wk ...	Install shafts, clean-out, install rebar, place conc. w/ LBC	60d	06-20-14	09-15-14	340d		RB1310	RB1330
RB1330	5d/Wk ...	FRP pilecap w/ LBC	60d	07-21-14	10-13-14	340d		RB1320	RB1350, RB1340
RB1340	5d/Wk ...	FRP columns and bent cap w/ LBC	60d	08-18-14	11-10-14	340d		RB1330	RB1360
RB1350	5d/Wk ...	Remove sheeting and backfill	20d	10-14-14	11-10-14	360d		RB1330	RB1360
RB1360	5d/Wk ...	Erect approach spans	50d	11-11-14	01-22-15	340d		RB1340, RB1350	RB1290
P3			285d	04-03-14	05-14-15	275d			
RB1400	5d/Wk ...	Move large barge to P3 & Install Temporary Piles	10d	04-03-14	04-16-14	0d		RB1220	RB1410, RB1420
RB1410	5d/Wk ...	Install NB shafts, clean-out, install reinf., place conc.	80d	04-17-14	08-08-14	0d		RB1400	RB1440, RB1540, RB1430
RB1420	5d/Wk ...	Install SB shafts, clean-out, install reinf., place conc.	80d	04-17-14	08-08-14	0d		RB1400	RB1440, RB1540, RB1430

Columbia River CROSSING

Remaining Work | Critical Remaining Work | Actual Work
Remaining Level of Effort | Milestone

Data Date: 09-01-08

Print Date/Time: 05-28-09 12:10

CRC Project Schedule (Baseline w/ current data through 4/22/09)

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
RB1430	5d/Wk ...	Float-in NB precast pile cap	10d	07-28-14	08-08-14	135d		RB1410, RB1420	RB1440
RB1440	5d/Wk ...	FRP NB pile cap	30d	08-11-14	09-22-14	135d		RB1230, RB1420, RB1410, RB1430	RB1460, RB1450
RB1450	5d/Wk ...	Float-in SB precast pile cap	10d	09-09-14	09-22-14	135d		RB1440	RB1460
RB1460	5d/Wk ...	FRP SB pile cap	30d	09-23-14	11-03-14	135d		RB1440, RB1450	RB1470
RB1470	5d/Wk ...	Install tower crane between NB/SB structures	10d	11-04-14	11-17-14	135d		RB1460	RB1480
RB1480	5d/Wk ...	FRP NB and SB piers	45d	11-18-14	01-22-15	135d		RB1260, RB1470	RB1490, RB1620
RB1490	5d/Wk ...	FRP NB and SB pier tables	45d	01-09-15	03-12-15	135d		RB1480	RB1500
RB1500	5d/Wk ...	Erect balanced cantilevers	45d	02-27-15	04-30-15	135d		RB1490, RB1280	RB1510, RB1640
RB1510	5d/Wk ...	Cast closure between P2/P3	15d	04-24-15	05-14-15	275d		RB1500	RB1990
P5			275d	08-11-14	09-08-15	90d			
RB1540	5d/Wk ...	Move large barge to P5 & Install Temporary Piles	10d	08-11-14	08-22-14	0d		RB1420, RB1410	RB1550, RB1560
RB1550	5d/Wk ...	Install NB shafts, clean-out, install reinf., place conc.	80d	08-25-14	12-16-14	0d		RB1540	RB1570, RB1670
RB1560	5d/Wk ...	Install SB shafts, clean-out, install reinf., place conc.	80d	08-25-14	12-16-14	0d		RB1540	RB1570, RB1670
RB1570	5d/Wk ...	Float-in NB precast pile cap	10d	12-03-14	12-16-14	90d		RB1550, RB1560	RB1580
RB1580	5d/Wk ...	FRP NB pile cap	30d	12-17-14	01-29-15	90d		RB1570	RB1600, RB1590
RB1590	5d/Wk ...	Float-in SB precast pile cap	10d	01-16-15	01-29-15	90d		RB1580	RB1600
RB1600	5d/Wk ...	FRP SB pile cap	30d	01-30-15	03-12-15	90d		RB1580, RB1590	RB1610
RB1610	5d/Wk ...	Install tower crane between NB/SB structures	10d	03-13-15	03-26-15	90d		RB1600	RB1620
RB1620	5d/Wk ...	FRP NB and SB piers	45d	03-27-15	05-29-15	90d		RB1610, RB1480	RB1630, RB1740
RB1630	5d/Wk ...	FRP NB and SB pier tables	45d	05-15-15	07-20-15	90d		RB1620	RB1640
RB1640	5d/Wk ...	Erect balanced cantilevers	45d	07-07-15	09-08-15	90d		RB1630, RB1500	RB1760
P6			485d	10-07-14	08-30-16	363d			
RB1670	5d/Wk ...	Install cofferdam	50d	10-07-14	12-16-14	0d		RB1550, RB1560	RB1680
RB1680	5d/Wk ...	Move large barge to P6 & Install Temporary Piles	10d	12-17-14	12-31-14	0d		RB1670	RB1690, RB1700
RB1690	5d/Wk ...	Install NB shafts, clean-out, install reinf., place conc.	80d	01-02-15	04-23-15	0d		RB1680	RB1710, RB1810
RB1700	5d/Wk ...	Install SB shafts, clean-out, install reinf., place conc.	80d	01-02-15	04-23-15	0d		RB1680	RB1710, RB1810
RB1710	5d/Wk ...	FRP NB and SB pilecaps	60d	04-24-15	07-20-15	25d		RB1700, RB1690	RB1720, RB1850
RB1720	5d/Wk ...	Remove cofferdam	20d	07-21-15	08-17-15	25d		RB1710	RB1730
RB1730	5d/Wk ...	Install tower crane between NB/SB structures	10d	08-18-15	08-31-15	25d		RB1720	RB1740
RB1740	5d/Wk ...	FRP NB and SB piers	45d	09-01-15	11-03-15	25d		RB1730, RB1620	RB1750, RB1890
RB1750	5d/Wk ...	FRP NB and SB pier tables	45d	10-21-15	12-23-15	25d		RB1740	RB1760
RB1760	5d/Wk ...	Erect SB & NB balanced cantilevers	45d	12-10-15	02-12-16	25d		RB1750, RB1640	RB1770, RB1910
RB1770	5d/Wk ...	Cast closure between SB P5/P6	15d	05-23-16	06-13-16	0d		RB1760, RB1910	RB1980, RB2030
RB1780	5d/Wk ...	Cast closure between NB P5/P6	15d	08-10-16	08-30-16	363d		RB2000	141800, RB2030
P4			290d	04-24-15	06-13-16	0d			
RB1810	5d/Wk ...	Move large barge to P4 & Install Temporary Piles	10d	04-24-15	05-07-15	0d		RB1700, RB1690	RB1820, RB1830
RB1820	5d/Wk ...	Install NB shafts, clean-out, install reinf., place conc.	80d	05-08-15	08-31-15	0d		RB1810	RB1840
RB1830	5d/Wk ...	Install SB shafts, clean-out, install reinf., place conc.	80d	05-08-15	08-31-15	0d		RB1810	RB1840
RB1840	5d/Wk ...	Float-in NB precast pile cap	10d	08-18-15	08-31-15	0d		RB1820, RB1830	RB1850
RB1850	5d/Wk ...	FRP NB pile cap	30d	09-01-15	10-13-15	0d		RB1710, RB1840	RB1860
RB1860	5d/Wk ...	Float-in SB precast pile cap	10d	09-30-15	10-13-15	0d		RB1850	RB1870
RB1870	5d/Wk ...	FRP SB pile cap	30d	10-14-15	11-24-15	0d		RB1860	RB1880
RB1880	5d/Wk ...	Install tower crane between NB/SB structures	10d	11-25-15	12-09-15	0d		RB1870	RB1890
RB1890	5d/Wk ...	FRP NB and SB piers	45d	12-10-15	02-12-16	0d		RB1880, RB1740	RB1900
RB1900	5d/Wk ...	FRP NB and SB pier tables	45d	02-01-16	04-01-16	0d		RB1890	RB1910
RB1910	5d/Wk ...	Erect balanced cantilevers	45d	03-21-16	05-20-16	0d		RB1900, RB1760	RB1770, RB1920, RB1930
RB1920	5d/Wk ...	Cast closure between P3/P4	15d	05-23-16	06-13-16	0d		RB1910	RB1990
RB1930	5d/Wk ...	Cast closure between P4/P5	15d	05-23-16	06-13-16	0d		RB1910	RB1990
P7			310d	07-07-15	09-21-16	645d			
RB1960	5d/Wk ...	Construct SB & NB spread footing	60d	07-07-15	09-29-15	110d		RB1020	RB1970
RB1970	5d/Wk ...	FRP SB columns and bent cap w/ LBC	40d	09-30-15	11-24-15	110d		RB1960	RB1980
RB1980	5d/Wk ...	Erect SB backspans	30d	05-02-16	06-13-16	0d		RB1770, RB1970	RB2030, RB1990
RB1990	5d/Wk ...	TRAFFIC MOVED TO SB STRUCTURE	0d		06-13-16*	0d	06-13-16	RB1930, RB1920, RB1980, RB1290, RB1510, Hi1400, 141330, EP0100	RB2000, 141800, TR8400, 141410, 141400, Hi1410, Hi1420, DM1110
RB2000	5d/Wk ...	FRP NB columns and bent cap w/ LBC	40d	06-14-16	08-09-16	348d		RB1990	RB1780, RB2010
RB2010	5d/Wk ...	Erect NB backspans	30d	08-10-16	09-21-16	348d		RB2000	141800, RB2030
RB2030	5d/Wk ...	CRC Bridge Construction Complete	0d		09-21-16	645d		RB1980, RB2010, RB1770, RB1780	CN1030
SR14 Interchange Construction			124...	05-29-13	04-23-18	242d			
141020	5d/Wk ...	SR14 Mobilization	72d	05-29-13	09-09-13	73d		RB1010, EP4200, EP4700	141150, 141120, 141130, 141140, 141100, 141110
SR-14 Stage 1			139d	09-10-13	03-26-14	72d			
141100	6d/Wk ...	Close I-5 NB to C Street	24d	09-10-13	10-07-13	184d		141020	141160
141110	6d/Wk ...	Close SR-14 WB to C St., Remove Struct Ovr	24d	09-10-13	10-07-13	184d		141020	141160
141120	6d/Wk ...	Construct Detour SR-14 WB to 4th St	48d	09-10-13	11-04-13	160d		141020	141170
141130	6d/Wk ...	Construct I-5 NB CD	120d	09-10-13	01-29-14	136d		141020	141250, 141240
141140	6d/Wk ...	Construct SR-14 WB to I-5 NB & Open	120d	09-10-13	01-29-14	136d		141020	141250
141150	6d/Wk ...	Close & Remove Evergreen Overpass, Construct New	168d	09-10-13	03-26-14	88d		141020	141250
141160	6d/Wk ...	Construct Detours I-5 NB & SB	48d	10-08-13	12-02-13	184d		141100, 141110	141250, 141240
141170	6d/Wk ...	Close Washington St. to SR-14 EB	24d	11-05-13	12-02-13	160d		141120	141200
SR-14 Stage 2			395d	12-03-13	06-20-15	349d			
141200	6d/Wk ...	Construct Detour SR-14 WB to I-5 SB	24d	12-03-13	12-31-13	160d		141170	141250, 141220
141210	6d/Wk ...	Const Detour SR14 WB to I-5 SB Loop	10d	01-02-14	01-15-14	596d		141220	141230
141220	5d/Wk ...	Const SR14 WB to I-5 SB Loop	128d	01-02-14	07-01-14	596d		141200	141210
141230	6d/Wk ...	Demo North Half of SR-14 H	24d	01-16-14	02-12-14	724d		141210	141330
141240	6d/Wk ...	Construct Detour I-5 SB to SR 14 EB	72d	03-27-14	06-18-14	232d		141250, 141160, 141130	141260
141250	6d/Wk ...	Construct I-5 SB to SR-14 Tunnels	216d	03-27-14	12-04-14	88d		141200, 141140, 141130, 141160, 141150	141240, 141260
141260	6d/Wk ...	Demo SR-14 D over I-5	24d	12-05-14	01-03-15	88d		141250, 141240	141270, 141300, 141310
141270	6d/Wk ...	Construct I-5 SB App & Rdwy Partial	144d	01-05-15	06-20-15	88d		141260	141310
SR-14 Stage 3			297d	01-05-15	03-02-16	72d			
141300	6d/Wk ...	Demo SR-14 E	24d	01-05-15	01-31-15	424d		141260	141330
141310	6d/Wk ...	Construct Remainder SB App & I-5 SB Rdwy	216d	06-22-15	03-02-16	88d		141270, 141260	141330
141330	5d/Wk ...	SR14 READY for the TRAFFIC SWITCH to NEW I-5 SB	0d		03-02-16	72d		141230, 141310, 141300	RB1990

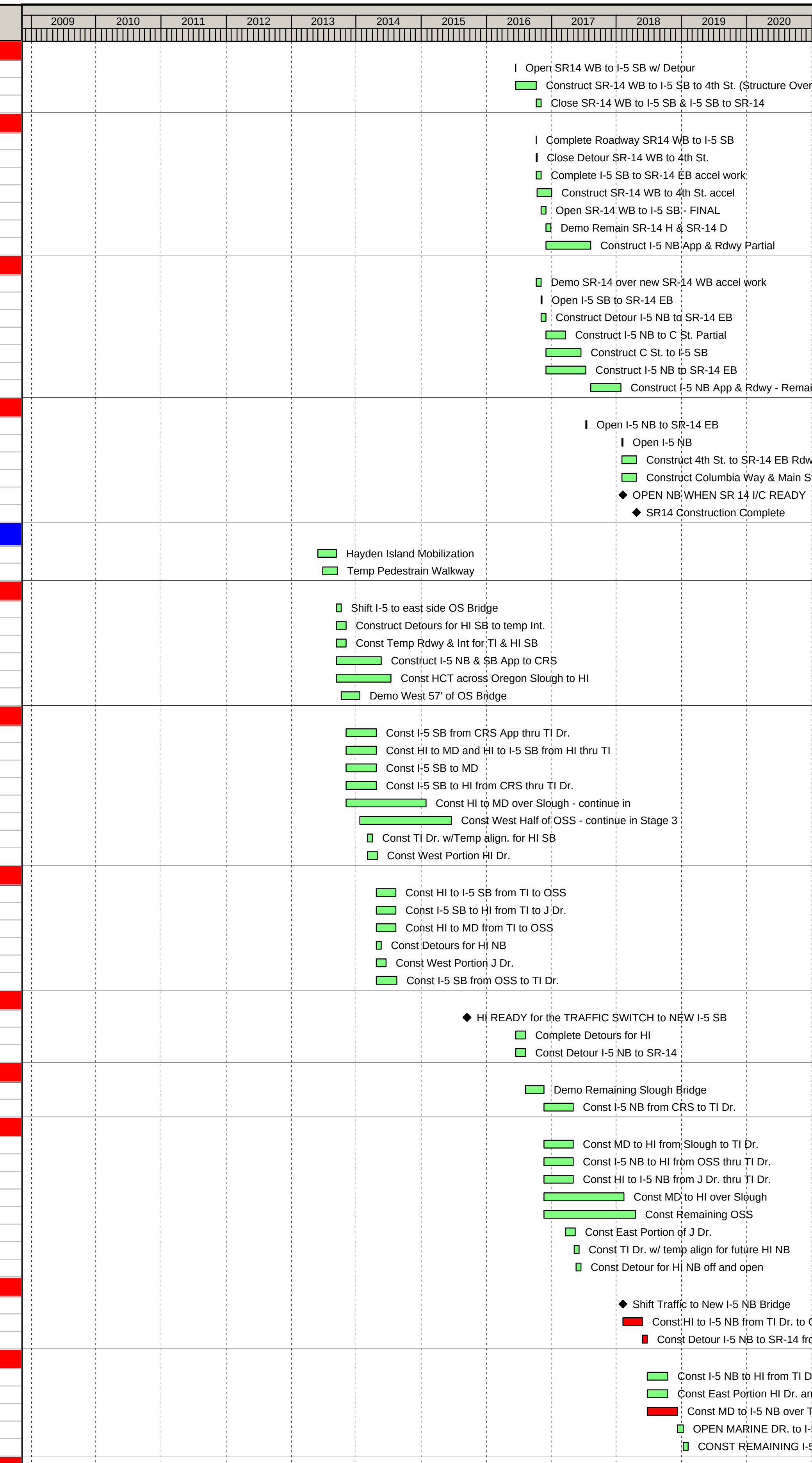
Columbia River CROSSING

Remaining Work | Critical Remaining Work | Actual Work
Remaining Level of Effort | ◆ Milestone

Data Date: 09-01-08
Print Date/Time: 05-28-09 12:10

CRC Project Schedule (Baseline w/ current data through 4/22/09)

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
SR-14 Stage 4			100d	06-14-16	11-02-16	0d			
141400	5d/Wk ...	Open SR14 WB to I-5 SB w/ Detour	1d	06-14-16	06-14-16	0d		RB1990	141410
141410	6d/Wk ...	Construct SR-14 WB to I-5 SB to 4th St. (Structure Over I-5)	96d	06-15-16	10-05-16	0d		141400, RB1990	141420, 141510, 141520, 141600, 141500
141420	6d/Wk ...	Close SR-14 WB to I-5 SB & I-5 SB to SR-14	24d	10-06-16	11-02-16	0d		141410	141540
SR-14 Stage 5			216d	10-06-16	08-10-17	117d			
141500	5d/Wk ...	Complete Roadway SR14 WB to I-5 SB	1d	10-06-16	10-06-16	19d		141410	141540
141510	6d/Wk ...	Close Detour SR-14 WB to 4th St.	6d	10-06-16	10-12-16	330d		141410	141530
141520	6d/Wk ...	Complete I-5 SB to SR-14 EB accel work	24d	10-06-16	11-02-16	24d		141410	141610, 141560
141530	6d/Wk ...	Construct SR-14 WB to 4th St. accel	72d	10-13-16	01-04-17	330d		141510	141710
141540	6d/Wk ...	Open SR-14 WB to I-5 SB - FINAL	24d	11-03-16	11-30-16	0d		141500, 141420	TR8800, 141560
141550	6d/Wk ...	Demo Remain SR-14 H & SR-14 D	24d	12-01-16	12-28-16	336d		141620, 141610	141710
141560	6d/Wk ...	Construct I-5 NB App & Rdwy Partial	216d	12-01-16	08-10-17	0d		141520, 141540	141660
SR-14 Stage 6			333d	10-06-16	01-27-18	0d			
141600	6d/Wk ...	Demo SR-14 over new SR-14 WB accel work	24d	10-06-16	11-02-16	66d		141410	141620
141610	6d/Wk ...	Open I-5 SB to SR-14 EB	6d	11-03-16	11-09-16	354d		141520	141550
141620	6d/Wk ...	Construct Detour I-5 NB to SR-14 EB	24d	11-03-16	11-30-16	66d		141600	141650, 141630, 141640, 141550
141630	6d/Wk ...	Construct I-5 NB to C St. Partial	96d	12-01-16	03-22-17	264d		141620	141710
141640	6d/Wk ...	Construct C St. to I-5 SB	168d	12-01-16	06-14-17	192d		141620	141710
141650	6d/Wk ...	Construct I-5 NB to SR-14 EB	192d	12-01-16	07-13-17	66d		141620	141710, 141700
141660	6d/Wk ...	Construct I-5 NB App & Rdwy - Remaining	144d	08-11-17	01-27-18	0d		141560	141710
SR-14 Stage 7			197d	07-14-17	04-23-18	242d			
141700	6d/Wk ...	Open I-5 NB to SR-14 EB	6d	07-14-17	07-20-17	66d		141650	141800, DM1110
141710	6d/Wk ...	Open I-5 NB	6d	01-29-18	02-03-18	0d		141650, 141530, 141550, 141630, 141640, 141660	141720, 141730, 141800
141720	6d/Wk ...	Construct 4th St. to SR-14 EB Rdwy	72d	01-29-18	04-21-18	294d		141710	141850
141730	6d/Wk ...	Construct Columbia Way & Main St.	72d	01-29-18	04-21-18	294d		141710	141850
141800	5d/Wk ...	OPEN NB WHEN SR 14 I/C READY	0d		02-05-18	0d		RB1990, 141710, 141700, RB2010, RB1780	Hi1700
141850	5d/Wk ...	SR14 Construction Complete	0d		04-23-18	242d		141720, 141730	CN1030
Hayden Island Interchange Construction			149...	05-29-13	04-04-19	0d			
Hi1020	5d/Wk ...	Hayden Island Mobilization	72d	05-29-13	09-09-13	252d		RB1010, EP4100, EP4600	Hi1130, Hi1110, Hi1100, Hi1120, Hi1140, Hi1030
Hi1030	5d/Wk ...	Temp Pedestrain Walkway	60d	06-26-13	09-19-13	264d		Hi1020	Hi1150
HI Stage 1			216d	09-10-13	07-15-14	630d			
Hi1100	6d/Wk ...	Shift I-5 to east side OS Bridge	24d	09-10-13	10-07-13	306d		Hi1020	Hi1150
Hi1110	6d/Wk ...	Construct Detours for HI SB to temp Int.	48d	09-10-13	11-04-13	311d		Hi1020	Hi1220, Hi1230, Hi1240, Hi1210
Hi1120	6d/Wk ...	Const Temp Rdwy & Int for TI & HI SB	48d	09-10-13	11-04-13	311d		Hi1020	Hi1200, Hi1240, Hi1210, Hi1230
Hi1130	6d/Wk ...	Construct I-5 NB & SB App to CRS	216d	09-10-13	05-21-14	640d		Hi1020	Hi1400
Hi1140	5d/Wk ...	Const HCT across Oregon Slough to HI	216d	09-10-13	07-15-14	630d		Hi1020	TR8300
Hi1150	5d/Wk ...	Demo West 57' of OS Bridge	72d	10-08-13	01-20-14	252d		Hi1100, Hi1030	Hi1250
HI Stage 2			412d	11-05-13	06-17-15	252d			
Hi1200	6d/Wk ...	Const I-5 SB from CRS App thru TI Dr.	144d	11-05-13	04-23-14	311d		Hi1120	TR8100, Hi1340, Hi1330, Hi1260, Hi1270, Hi1350
Hi1210	6d/Wk ...	Const HI to MD and HI to I-5 SB from HI thru TI	144d	11-05-13	04-23-14	311d		Hi1120, Hi1110	TR8100, Hi1400
Hi1220	6d/Wk ...	Const I-5 SB to MD	144d	11-05-13	04-23-14	311d		Hi1110	TR8100, Hi1400
Hi1230	6d/Wk ...	Const I-5 SB to HI from CRS thru TI Dr.	144d	11-05-13	04-23-14	311d		Hi1110, Hi1120	TR8100, Hi1400
Hi1240	5d/Wk ...	Const HI to MD over Slough - continue in	312d	11-05-13	01-27-15	352d		Hi1120, Hi1110	Hi1400
Hi1250	5d/Wk ...	Const West Half of OSS - continue in Stage 3	360d	01-21-14	06-17-15	252d		Hi1150	Hi1400, Hi1300, Hi1310, Hi1320, MD1300
Hi1260	6d/Wk ...	Const TI Dr. w/Temp align. for HI SB	24d	03-06-14	04-02-14	586d		Hi1200	Hi1350
Hi1270	6d/Wk ...	Const West Portion HI Dr.	48d	03-06-14	04-30-14	658d		Hi1200	Hi1400
HI Stage 3			81d	04-22-14	08-14-14	466d			
Hi1300	6d/Wk ...	Const HI to I-5 SB from TI to OSS	96d	04-22-14	08-12-14	570d		Hi1250	Hi1400
Hi1310	6d/Wk ...	Const I-5 SB to HI from TI to J Dr.	96d	04-22-14	08-12-14	570d		Hi1250	Hi1400
Hi1320	6d/Wk ...	Const HI to MD from TI to OSS	96d	04-22-14	08-12-14	570d		Hi1250	Hi1400
Hi1330	6d/Wk ...	Const Detours for HI NB	24d	04-24-14	05-21-14	640d		Hi1200	Hi1400
Hi1340	6d/Wk ...	Const West Portion J Dr.	48d	04-24-14	06-18-14	616d		Hi1200	Hi1400
Hi1350	6d/Wk ...	Const I-5 SB from OSS to TI Dr.	96d	04-24-14	08-14-14	568d		Hi1260, Hi1200	Hi1400
HI Stage 4			229d	09-16-15	08-09-16	45d			
Hi1400	6d/Wk ...	HI READY for the TRAFFIC SWITCH to NEW I-5 SB	0d		09-16-15	230d		Hi1130, Hi1240, Hi1210, Hi1220, Hi1230, Hi1270, Hi1250, Hi1350, Hi1300, ...	RB1990
Hi1410	6d/Wk ...	Complete Detours for HI	48d	06-14-16	08-09-16	55d		RB1990	Hi1500
Hi1420	6d/Wk ...	Const Detour I-5 NB to SR-14	48d	06-14-16	08-09-16	55d		RB1990	Hi1500
HI Stage 5			189d	08-10-16	05-05-17	189d			
Hi1500	5d/Wk ...	Demo Remaining Slough Bridge	72d	08-10-16	11-18-16	45d		Hi1410, Hi1420	Hi1640, Hi1630, Hi1600, Hi1610, Hi1620, Hi1510
Hi1510	6d/Wk ...	Const I-5 NB from CRS to TI Dr.	144d	11-19-16	05-05-17	232d		Hi1500	Hi1700
HI Stage 6			360d	11-19-16	04-19-18	45d			
Hi1600	6d/Wk ...	Const MD to HI from Slough to TI Dr.	144d	11-19-16	05-05-17	352d		Hi1500	Hi1820
Hi1610	6d/Wk ...	Const I-5 NB to HI from OSS thru TI Dr.	144d	11-19-16	05-05-17	208d		Hi1500	Hi1660
Hi1620	6d/Wk ...	Const HI to I-5 NB from J Dr. thru TI Dr.	144d	11-19-16	05-05-17	232d		Hi1500	Hi1660, Hi1720
Hi1630	5d/Wk ...	Const MD to HI over Slough	312d	11-21-16	02-12-18	93d		Hi1500	Hi1820
Hi1640	5d/Wk ...	Const Remaining OSS	360d	11-21-16	04-19-18	45d		Hi1500	Hi1650, Hi1820, Hi1800, Hi1810
Hi1650	6d/Wk ...	Const East Portion of J Dr.	48d	03-22-17	05-16-17	199d		Hi1640	Hi1670
Hi1660	6d/Wk ...	Const TI Dr. w/ temp align for future HI NB	24d	05-06-17	06-02-17	208d		Hi1620, Hi1610	Hi1670
Hi1670	6d/Wk ...	Const Detour for HI NB off and open	24d	05-17-17	06-13-17	199d		Hi1660, Hi1650	Hi1700
HI Stage 7			99d	02-05-18	06-25-18	0d			
Hi1700	6d/Wk ...	Shift Traffic to New I-5 NB Bridge	0d		02-05-18	0d		Hi1510, Hi1670, 141800, MD1420, MD1410, MD1430	Hi1710
Hi1710	6d/Wk ...	Const HI to I-5 NB from TI Dr. to CRS	96d	02-05-18	05-28-18	0d		Hi1700	Hi1820, Hi1800, Hi1810, Hi1720
Hi1720	6d/Wk ...	Const Detour I-5 NB to SR-14 from TI to NB	24d	05-28-18	06-25-18	0d		Hi1620, Hi1710	Hi1800, Hi1810, Hi1820
HI Stage 8			158d	06-25-18	02-07-19	40d			
Hi1800	6d/Wk ...	Const I-5 NB to HI from TI Dr. to HI Dr.	96d	06-25-18	10-16-18	48d		Hi1710, Hi1720, Hi1640	Hi1900
Hi1810	6d/Wk ...	Const East Portion HI Dr. and TI Dr.	96d	06-25-18	10-16-18	48d		Hi1710, Hi1720, Hi1640	Hi1900
Hi1820	6d/Wk ...	Const MD to I-5 NB over TI Dr.	144d	06-25-18	12-11-18	0d		Hi1710, Hi1720, Hi1640, Hi1630, Hi1600	Hi1900, Hi1830
Hi1830	6d/Wk ...	OPEN MARINE DR. to I-5 NB w/ HI STAGE 8	24d	12-11-18	01-10-19	48d		Hi1820	Hi1840
Hi1840	6d/Wk ...	CONST REMAINING I-5 SB under TRAFFIC	24d	01-10-19	02-07-19	48d		Hi1830	CN1030
HI Stage 9			80d	12-11-18	04-04-19	0d			



Columbia River CROSSING

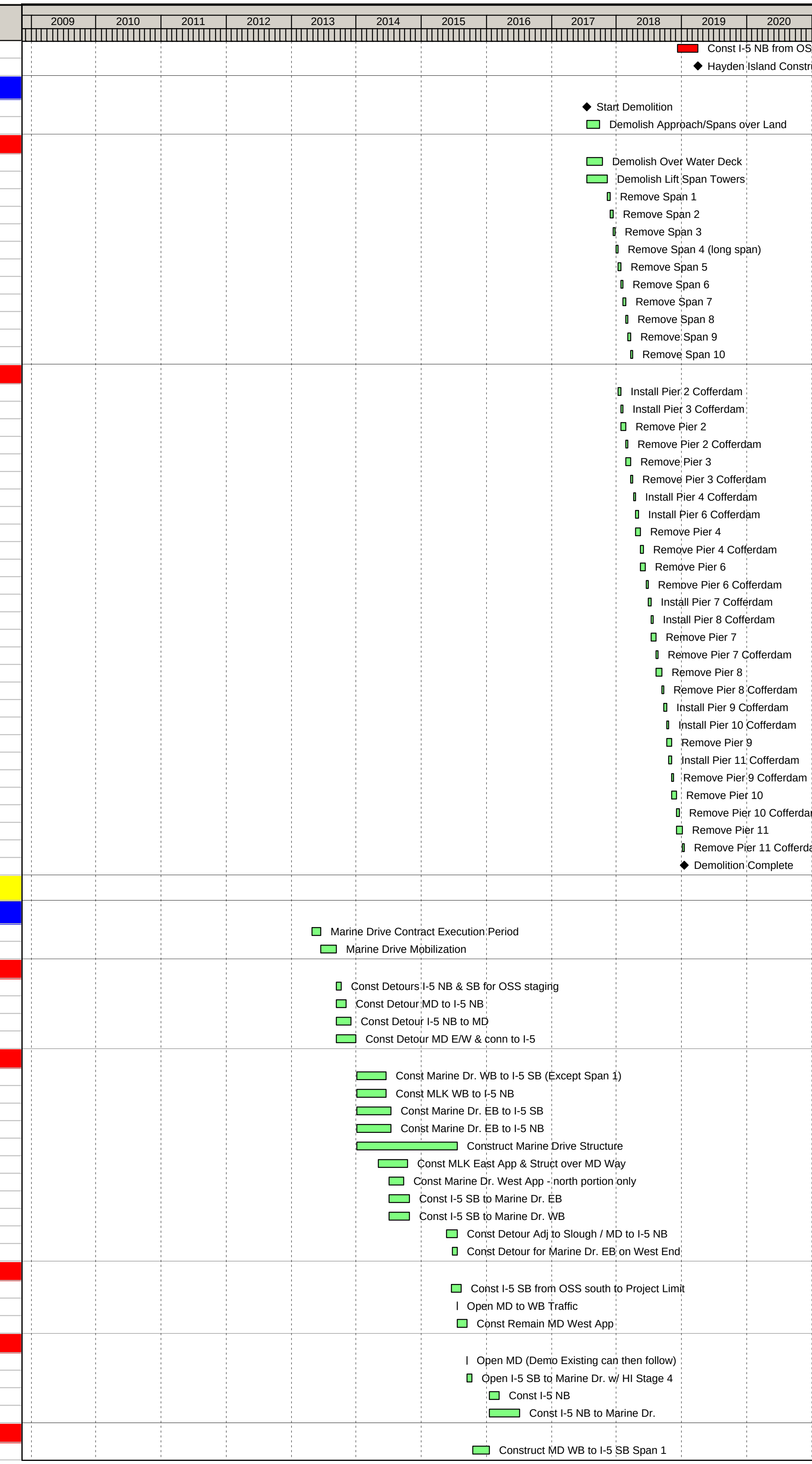
Remaining Work · Critical Remaining Work · Actual Work
Remaining Level of Effort ◆ · ◆ Milestone

Data Date: 09-01-08

Print Date/Time: 05-28-09 12:10

CRC Project Schedule (Baseline w/ current data through 4/22/09)

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
Hi1900	6d/Wk ...	Const I-5 NB from OSS to TI Dr.	96d	12-11-18	04-04-19	0d		Hi1820, Hi1800, Hi1810	Hi1910
Hi1910	5d/Wk ...	Hayden Island Construction Complete	0d		04-04-19	0d		Hi1900	CN1030
I-5 Columbia River Bridge Demolition			380d	07-21-17	01-17-19	54d			
DM1110	5d/Wk ...	Start Demolition	0d	07-21-17		54d		RB1990, 141700	DM1120, DM1130, DM1140
DM1120	5d/Wk ...	Demolish Approach/Spans over Land	50d	07-21-17	09-29-17	384d		DM1110	DM1580
Superstructure Demolition			180d	07-21-17	04-04-18	254d			
DM1130	5d/Wk ...	Demolish Over Water Deck	60d	07-21-17	10-13-17	74d		DM1110	DM1150, DM1160, DM1170
DM1140	5d/Wk ...	Demolish Lift Span Towers	80d	07-21-17	11-10-17	54d		DM1110	DM1150, DM1160, DM1170
DM1150	5d/Wk ...	Remove Span 1	10d	11-13-17	11-27-17	54d		DM1130, DM1140	DM1160
DM1160	5d/Wk ...	Remove Span 2	10d	11-28-17	12-11-17	54d		DM1150, DM1130, DM1140	DM1170
DM1170	5d/Wk ...	Remove Span 3	10d	12-12-17	12-26-17	54d		DM1160, DM1130, DM1140	DM1180
DM1180	5d/Wk ...	Remove Span 4 (long span)	10d	12-27-17	01-10-18	54d		DM1170	DM1190, DM1310
DM1190	5d/Wk ...	Remove Span 5	10d	01-11-18	01-24-18	254d		DM1180	DM1200
DM1200	5d/Wk ...	Remove Span 6	10d	01-25-18	02-07-18	254d		DM1190	DM1210
DM1210	5d/Wk ...	Remove Span 7	10d	02-08-18	02-21-18	254d		DM1200	DM1220
DM1220	5d/Wk ...	Remove Span 8	10d	02-22-18	03-07-18	254d		DM1210	DM1230
DM1230	5d/Wk ...	Remove Span 9	10d	03-08-18	03-21-18	254d		DM1220	DM1240
DM1240	5d/Wk ...	Remove Span 10	10d	03-22-18	04-04-18	254d		DM1230	DM1580
Substructure Demolition			260d	01-11-18	01-17-19	54d			
DM1310	5d/Wk ...	Install Pier 2 Cofferdam	10d	01-11-18	01-24-18	54d		DM1180	DM1330, DM1320
DM1320	5d/Wk ...	Install Pier 3 Cofferdam	10d	01-25-18	02-07-18	64d		DM1310	DM1350, DM1340
DM1330	5d/Wk ...	Remove Pier 2	20d	01-25-18	02-21-18	54d		DM1310	DM1340, DM1350
DM1340	5d/Wk ...	Remove Pier 2 Cofferdam	10d	02-22-18	03-07-18	64d		DM1330, DM1320	DM1360
DM1350	5d/Wk ...	Remove Pier 3	20d	02-22-18	03-21-18	54d		DM1320, DM1330	DM1360, DM1390
DM1360	5d/Wk ...	Remove Pier 3 Cofferdam	10d	03-22-18	04-04-18	54d		DM1350, DM1340	DM1370
DM1370	5d/Wk ...	Install Pier 4 Cofferdam	10d	04-05-18	04-18-18	54d		DM1360	DM1390, DM1380
DM1380	5d/Wk ...	Install Pier 6 Cofferdam	10d	04-19-18	05-02-18	64d		DM1370	DM1410, DM1400
DM1390	5d/Wk ...	Remove Pier 4	20d	04-19-18	05-16-18	54d		DM1370, DM1350	DM1400, DM1410
DM1400	5d/Wk ...	Remove Pier 4 Cofferdam	10d	05-17-18	05-31-18	64d		DM1390, DM1380	DM1420
DM1410	5d/Wk ...	Remove Pier 6	20d	05-17-18	06-14-18	54d		DM1380, DM1390	DM1420, DM1450
DM1420	5d/Wk ...	Remove Pier 6 Cofferdam	10d	06-15-18	06-28-18	54d		DM1410, DM1400	DM1430
DM1430	5d/Wk ...	Install Pier 7 Cofferdam	10d	06-29-18	07-13-18	54d		DM1420	DM1450, DM1440
DM1440	5d/Wk ...	Install Pier 8 Cofferdam	10d	07-16-18	07-27-18	64d		DM1430	DM1470, DM1460
DM1450	5d/Wk ...	Remove Pier 7	20d	07-16-18	08-10-18	54d		DM1430, DM1410	DM1460, DM1470
DM1460	5d/Wk ...	Remove Pier 7 Cofferdam	10d	08-13-18	08-24-18	64d		DM1450, DM1440	DM1480
DM1470	5d/Wk ...	Remove Pier 8	20d	08-13-18	09-10-18	54d		DM1440, DM1450	DM1480, DM1510
DM1480	5d/Wk ...	Remove Pier 8 Cofferdam	10d	09-11-18	09-24-18	54d		DM1470, DM1460	DM1490
DM1490	5d/Wk ...	Install Pier 9 Cofferdam	10d	09-25-18	10-08-18	54d		DM1480	DM1510, DM1500
DM1500	5d/Wk ...	Install Pier 10 Cofferdam	10d	10-09-18	10-22-18	64d		DM1490	DM1540, DM1530, DM1520
DM1510	5d/Wk ...	Remove Pier 9	20d	10-09-18	11-05-18	54d		DM1490, DM1470	DM1530, DM1540
DM1520	5d/Wk ...	Install Pier 11 Cofferdam	10d	10-23-18	11-05-18	74d		DM1500	DM1560
DM1530	5d/Wk ...	Remove Pier 9 Cofferdam	10d	11-06-18	11-19-18	74d		DM1510, DM1500	DM1550
DM1540	5d/Wk ...	Remove Pier 10	20d	11-06-18	12-04-18	54d		DM1500, DM1510	DM1550, DM1560
DM1550	5d/Wk ...	Remove Pier 10 Cofferdam	10d	12-05-18	12-18-18	64d		DM1540, DM1530	DM1570
DM1560	5d/Wk ...	Remove Pier 11	20d	12-05-18	01-03-19	54d		DM1520, DM1540	DM1570
DM1570	5d/Wk ...	Remove Pier 11 Cofferdam	10d	01-04-19	01-17-19	54d		DM1560, DM1550	DM1580
DM1580	5d/Wk ...	Demolition Complete	0d		01-17-19	54d		DM1570, DM1120, DM1240	CN1030
MARINE DRIVE Construction			812d	04-29-13	07-05-16	700d			
Marine Dr. Construction			812d	04-29-13	07-05-16	700d			
MD1010	6d/Wk ...	Marine Drive Contract Execution Period	42d	04-29-13	06-15-13	229d		AA1445	MD1020
MD1020	6d/Wk ...	Marine Drive Mobilization	72d	06-17-13	09-09-13	229d		MD1010, EP4100, EP4600	MD1130, MD1100, MD1120, MD1110
MD Stage 1			79d	09-10-13	12-31-13	189d			
MD1100	6d/Wk ...	Const Detours I-5 NB & SB for OSS staging	24d	09-10-13	10-07-13	301d		MD1020	MD1240
MD1110	6d/Wk ...	Const Detour MD to I-5 NB	48d	09-10-13	11-04-13	277d		MD1020	MD1240
MD1120	6d/Wk ...	Const Detour I-5 NB to MD	72d	09-10-13	12-02-13	253d		MD1020	MD1240
MD1130	6d/Wk ...	Const Detour MD E/W & conn to I-5	96d	09-10-13	12-31-13	229d		MD1020	MD1240, MD1220, MD1200, MD1230, MD1210
MD Stage 2			395d	01-02-14	07-20-15	189d			
MD1200	6d/Wk ...	Const Marine Dr. WB to I-5 SB (Except Span 1)	144d	01-02-14	06-18-14	565d		MD1130	MD1310
MD1210	6d/Wk ...	Const MLK WB to I-5 NB	144d	01-02-14	06-18-14	565d		MD1130	MD1310
MD1220	6d/Wk ...	Const Marine Dr. EB to I-5 SB	168d	01-02-14	07-17-14	541d		MD1130	MD1310
MD1230	6d/Wk ...	Const Marine Dr. EB to I-5 NB	168d	01-02-14	07-17-14	541d		MD1130	MD1310
MD1240	6d/Wk ...	Construct Marine Drive Structure	480d	01-02-14	07-20-15	229d		MD1130, MD1100, MD1120, MD1110	MD1285, MD1310, MD1280, MD1270, MD1290, MD1250, MD1260
MD1250	6d/Wk ...	Const MLK East App & Struct over MD Way	144d	05-02-14	10-17-14	462d		MD1240	MD1310
MD1260	6d/Wk ...	Const Marine Dr. West App - north portion only	72d	07-05-14	09-26-14	480d		MD1240	MD1310
MD1270	6d/Wk ...	Const I-5 SB to Marine Dr. EB	96d	07-05-14	10-24-14	456d		MD1240	MD1310
MD1280	6d/Wk ...	Const I-5 SB to Marine Dr. WB	96d	07-05-14	10-24-14	456d		MD1240	MD1310
MD1285	6d/Wk ...	Const Detour Adj to Slough / MD to I-5 NB	48d	05-25-15	07-20-15	229d		MD1240	MD1310
MD1290	6d/Wk ...	Const Detour for Marine Dr. EB on West End	24d	06-22-15	07-20-15	229d		MD1240	MD1310
MD Stage 3			62d	06-18-15	09-15-15	491d			
MD1300	6d/Wk ...	Const I-5 SB from OSS south to Project Limit	48d	06-18-15	08-13-15	626d		Hi1250	MD1430
MD1310	5d/Wk ...	Open MD to WB Traffic	1d	07-21-15	07-21-15	189d		MD1240, MD1260, MD1250, MD1220, MD1200, MD1230, MD1210, MD1280...	MD1320
MD1320	6d/Wk ...	Const Remain MD West App	48d	07-22-15	09-15-15	230d		MD1310	MD1400, Hi1400
MD Stage 4			205d	09-16-15	07-05-16	403d			
MD1400	5d/Wk ...	Open MD (Demo Existing can then follow)	1d	09-16-15	09-16-15	189d		MD1320	MD1410, MD1500, Hi1400
MD1410	6d/Wk ...	Open I-5 SB to Marine Dr. w/ HI Stage 4	24d	09-17-15	10-14-15	494d		MD1400	Hi1700, MD1500
MD1420	6d/Wk ...	Const I-5 NB	48d	01-19-16	03-14-16	589d		MD1500	Hi1700, MD1510
MD1430	6d/Wk ...	Const I-5 NB to Marine Dr.	144d	01-19-16	07-05-16	493d		MD1500, MD1300	Hi1700, MD1510
MD Stage 5			184d	10-15-15	07-05-16	700d			
MD1500	5d/Wk ...	Construct MD WB to I-5 SB Span 1	65d	10-15-15	01-18-16	405d		MD1400, MD1410	MD1420, MD1430, MD1510



Columbia River CROSSING

Remaining Work | Critical Remaining Work | Actual Work
Remaining Level of Effort | Milestone

Data Date: 09-01-08

Print Date/Time: 05-28-09 12:10

CRC Project Schedule (Baseline w/ current data through 4/22/09)

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
MD1510	5d/Wk ...	Marine Drive Construction Complete	0d		07-05-16	700d		MD1430, MD1420, MD1500	CN1030
500/MP/FP Construction			107...	12-15-14	02-27-19	25d			
Mill Plain & McLaughlin Construction			967d	12-15-14	09-28-18	131d			
MP1010	5d/Wk ...	Mill Plain Contract Execution Period	42d	12-15-14	02-12-15	131d		AA1545	MP1020
MP1020	5d/Wk ...	Mill Plain Mobilization	65d	02-13-15	05-14-15	131d		MP1010, EP4200, EP4700	MP1280, MP1340, MP1350
Stage 1			280d	05-14-15	06-17-16	131d			
MP1280	5d/Wk ...	Construct I-5 NB to Mill Plain ramp under traffic	43d	05-14-15	07-16-15	152d		MP1020	MP1360
MP1340	5d/Wk ...	Construct detour I-5 SB to Mill Plain	65d	05-14-15	08-14-15	131d		MP1020	MP1360
MP1350	5d/Wk ...	Construct I-5 NB to Fourth Plain Structures	151d	05-14-15	12-16-15	174d		MP1020	MP1400
MP1360	5d/Wk ...	Shift I-5 easterly from Evergreen to Mcloughlin	22d	08-17-15	09-16-15	131d		MP1280, MP1340	MP1370
MP1370	5d/Wk ...	Demo Mill Plain and McLoughlin Structures	43d	09-16-15	11-16-15	131d		MP1360	MP1390, MP1380
MP1380	5d/Wk ...	Construct west portion of I-5 over McLoughlin	129d	11-16-15	05-18-16	152d		MP1370	MP1420
MP1390	5d/Wk ...	Construct west portion of I-5 over Mill Plain	151d	11-16-15	06-17-16	131d		MP1370	MP1400, MP1410
MP1400	5d/Wk ...	Construct I-5 SB rwy lanes where practical	86d	02-18-16	06-17-16	131d		MP1390, MP1350	MP1420
MP1410	5d/Wk ...	Construct west side on and off tapers	65d	03-18-16	06-17-16	131d		MP1390	MP1420
Stage 2			65d	06-20-16	09-20-16	131d			
MP1420	5d/Wk ...	Shift MP on and off to/from I-5 SB	43d	06-20-16	08-18-16	131d		MP1410, MP1400, MP1380	MP1430
MP1430	5d/Wk ...	Shift I-5 west onto new lanes	22d	08-19-16	09-20-16	131d		MP1420	MP1440
Stage 3			172d	09-20-16	05-23-17	131d			
MP1440	5d/Wk ...	Demo existing I-5 NB to Fourth Plain Structures	22d	09-20-16	10-19-16	131d		MP1430	MP1450, MP1470
MP1450	5d/Wk ...	Demo eastern protion existing I-5 overcrossing Mill Plain	22d	09-20-16	10-19-16	131d		MP1440	MP1490, MP1460
MP1460	5d/Wk ...	Construct west I-5 NB over McLoughlin	22d	09-20-16	10-19-16	131d		MP1450, MP1470	MP1480
MP1470	5d/Wk ...	Demo eastern portion of I-5 overcrossing McLoughlin	43d	09-20-16	11-18-16	131d		MP1440	MP1460
MP1480	5d/Wk ...	Construct roadway approaches at McLoughlin	108d	09-20-16	02-21-17	131d		MP1460	MP1510, MP1500
MP1490	5d/Wk ...	Construct remainder I-5 overcrossing Mill Plain	129d	09-20-16	03-23-17	174d		MP1450	MP1520, MP1530
MP1500	5d/Wk ...	Construct detour for I-5 NB to Fourth Plain	22d	02-22-17	03-23-17	174d		MP1480	MP1520, MP1530
MP1510	5d/Wk ...	Construct detours for Mill Plain to I-5 NB	65d	02-22-17	05-23-17	131d		MP1480	MP1520, MP1530
Stage 4			215d	05-23-17	03-28-18	131d			
MP1520	5d/Wk ...	Demo east portion of I-5 over McLoughlin	22d	05-23-17	06-22-17	131d		MP1490, MP1510, MP1500	MP1540
MP1530	5d/Wk ...	Demo I-5 NB to 4th Plain over McLoughlin	22d	05-23-17	06-22-17	131d		MP1490, MP1510, MP1500	MP1540
MP1540	5d/Wk ...	Construct remainder of I-5 over McLoughlin	108d	06-23-17	11-24-17	131d		MP1520, MP1530	MP1550
MP1550	5d/Wk ...	Construct I-5 NB to 4th Plain O-xing McLoughlin	86d	11-24-17	03-28-18	131d		MP1540	MP1570
Stage 5			129d	03-28-18	09-28-18	131d			
MP1560	5d/Wk ...	Construct remaining ramps in SPUI and MP Alignment	108d	03-28-18	08-28-18	131d		MP1570	MP1580, MP1590
MP1570	5d/Wk ...	Construct I-5 NB rwy	129d	03-28-18	09-28-18	131d		MP1550	MP1560, MP1590
Stage 6 & 7			129d	03-28-18	09-28-18	131d			
MP1580	5d/Wk ...	Construct I-5 SB rwy from Evergreen to MP	129d	03-28-18	09-28-18	131d		MP1560	MP1590
MP1590	5d/Wk ...	Mill Plain Construction Complete	0d		09-28-18	131d		MP1570, MP1560, MP1580	CN1030
Fourth Plain Construction			731d	01-09-15	11-17-17	349d			
4P1010	5d/Wk ...	Fourth Plain Contract Execution Period	42d	01-09-15	03-09-15	349d		AA1645	4P1020
4P1020	5d/Wk ...	Fourth Plain Mobilization	60d	03-10-15	06-02-15	349d		4P1010, EP4200, EP4700	4P1110, 4P1120, 4P1130, 4P1030
4P1030	5d/Wk ...	Demo & Construct New 29th St. O-xing	213d	06-03-15	04-01-16	585d		4P1020	4P1250
Stage 1			287d	06-03-15	07-18-16	349d			
4P1110	5d/Wk ...	Close I-5 SB to the Fourth Plain exit	2d	06-03-15	06-04-15	374d		4P1020	4P1140
4P1120	5d/Wk ...	Shift 4P traffic to north side existing oxing	2d	06-03-15	06-04-15	349d		4P1020	4P1150
4P1130	5d/Wk ...	Construct 4P to P&R	40d	06-03-15	07-29-15	596d		4P1020	4P1190
4P1140	5d/Wk ...	Construct I-5 SB widening (perm & temp to accommodate all I-5 lanes)	40d	06-05-15	07-31-15	374d		4P1110	4P1170
4P1150	5d/Wk ...	Construct temporary support system for 4P oxing	60d	06-05-15	08-28-15	349d		4P1120	4P1160
4P1160	5d/Wk ...	Saw cut 4P oxing 8 ft right existing CL	5d	08-31-15	09-04-15	349d		4P1150	4P1170
4P1170	5d/Wk ...	Demo south portion existing 4P oxing	20d	09-08-15	10-05-15	349d		4P1160, 4P1140	4P1180
4P1180	5d/Wk ...	Construct south portion new 4P oxing and approaches	200d	10-06-15	07-18-16	349d		4P1170	4P1190
4P1190	5d/Wk ...	End Stage 1	0d		07-18-16	349d		4P1180, 4P1130	4P1210
Stage 2			222d	07-19-16	05-31-17	349d			
4P1210	5d/Wk ...	Shift 4P to new portion of structure	2d	07-19-16	07-20-16	349d		4P1190	4P1230, 4P1240, 4P1220
4P1220	5d/Wk ...	Shift I-5 NB to 4P to 4P to P&R alignment	2d	07-21-16	07-22-16	507d		4P1210	4P1250
4P1230	5d/Wk ...	Demo remainder existing 4P oxing	20d	07-21-16	08-17-16	349d		4P1210	4P1260
4P1240	5d/Wk ...	Close 4P to I-5 NB and construct new + accel	100d	07-21-16	12-09-16	469d		4P1210	4P1270
4P1250	5d/Wk ...	Construct new I-5 NB to 4P	60d	07-25-16	10-17-16	507d		4P1220, 4P1030	4P1270
4P1260	5d/Wk ...	Construct remainder new 4P oxing and approaches	200d	08-18-16	05-31-17	349d		4P1230	4P1270
4P1270	5d/Wk ...	End Stage 2	0d		05-31-17	349d		4P1260, 4P1240, 4P1250	4P1330, 4P1310, 4P1320
Stage 3			120d	06-01-17	11-17-17	349d			
4P1310	5d/Wk ...	Construct I-5 NB widening and overlay of existing	60d	06-01-17	08-24-17	389d		4P1270	4P1350, 4P1340
4P1320	5d/Wk ...	Construct 4P east and west (under traffic)	100d	06-01-17	10-20-17	369d		4P1270	4P1350
4P1330	5d/Wk ...	Construct remaining I-5 NB to 4P and 4P to P&R (structure too)	120d	06-01-17	11-17-17	349d		4P1270	4P1350
4P1340	5d/Wk ...	Construct I-5 SB under 4P oxing and overlay existing	60d	06-29-17	09-22-17	389d		4P1310	4P1350
4P1350	5d/Wk ...	Fourth Plain Construction Complete	0d		11-17-17	349d		4P1330, 4P1310, 4P1340, 4P1320	CN1030
SR500 Construction			105...	01-09-15	02-27-19	25d			
5H1010	5d/Wk ...	SR500 Contract Execution Period	42d	01-09-15	03-09-15	25d		AA1745	5H1020
5H1020	5d/Wk ...	SR500 Mobilization (33rd St o-xing constructed)	60d	03-10-15	06-02-15	25d		5H1010, EP4200, EP4700	5H1110, 5H1120, 5H1130, 5H1250, 5H1210, 5H1030
5H1030	5d/Wk ...	Demo & Construct New 33rd St. O-xing	213d	06-03-15	04-01-16	59d		5H1020	5H1320
Stage 1			85d	06-03-15	10-01-15	25d			
5H1110	5d/Wk ...	Close existing I-5 SB to 39th St	2d	06-03-15	06-04-15	28d		5H1020	5H1140
5H1120	5d/Wk ...	Restrict SR 500 to one lane each direction	5d	06-03-15	06-09-15	25d		5H1020	5H1150, 5H1160
5H1130	5d/Wk ...	Begin construction 4P walls and tunnel	80d	06-03-15	09-24-15	30d		5H1020	5H1180
5H1140	5d/Wk ...	Construct 13ft temp structure on north side 39th oxing	60d	06-05-15	08-28-15	28d		5H1110	5H1170
5H1150	5d/Wk ...	Construct detour I-5 NB to SR 500 EB to allow tunnel const	35d	06-10-15	07-29-15	70d		5H1120	5H1180
5H1160	5d/Wk ...	Construct I-5 SB widening east and west of 39th St	80d	06-10-15	10-01-15	25d		5H1120	5H1180
5H1170	5d/Wk ...	Construct embankment to fit temp 39th oxing	20d	08-31-15	09-28-15	28d		5H1140	5H1180
5H1180	5d/Wk ...	End Stage 1	0d		10-01-15	25d		5H1170, 5H1160, 5H1130, 5H1150	5H1220

Columbia River CROSSING

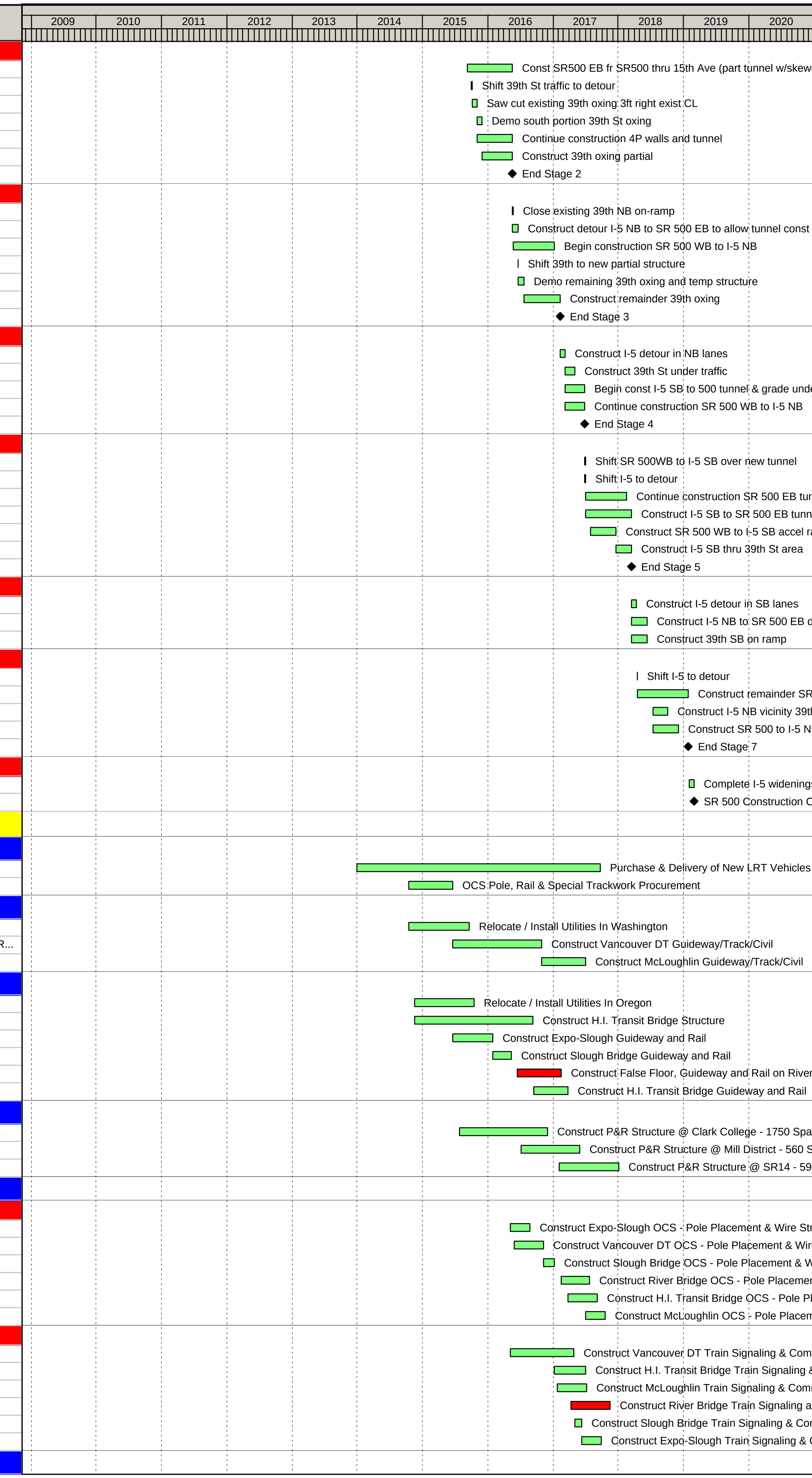
Remaining Work | Critical Remaining Work | Actual Work
Remaining Level of Effort ◆ Milestone

Data Date: 09-01-08

Print Date/Time: 05-28-09 12:10

CRC Project Schedule (Baseline w/ current data through 4/22/09)

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
Stage 2			180d	09-08-15	05-19-16	25d			
5H1210	5d/Wk ...	Const SR500 EB fr SR500 thru 15th Ave (part tunnel w/skewed cn jnt)	180d	09-08-15	05-19-16	25d		5H1260, 5H1020	5H1270
5H1220	5d/Wk ...	Shift 39th St traffic to detour	2d	10-02-15	10-05-15	25d		5H1180	5H1230
5H1230	5d/Wk ...	Saw cut existing 39th oxing 3ft right exist CL	20d	10-06-15	11-02-15	25d		5H1220	5H1240
5H1240	5d/Wk ...	Demo south portion 39th St oxing	20d	11-03-15	12-01-15	25d		5H1230	5H1260
5H1250	5d/Wk ...	Continue construction 4P walls and tunnel	140d	11-03-15	05-19-16	25d		5H1260, 5H1020	5H1270
5H1260	5d/Wk ...	Construct 39th oxing partial	120d	12-02-15	05-19-16	25d		5H1240	5H1270, 5H1250, 5H1210
5H1270	5d/Wk ...	End Stage 2	0d		05-19-16	25d		5H1260, 5H1210, 5H1250	5H1320, 5H1310
Stage 3			182d	05-20-16	02-07-17	25d			
5H1310	5d/Wk ...	Close existing 39th NB on-ramp	2d	05-20-16	05-23-16	45d		5H1270	5H1330
5H1320	5d/Wk ...	Construct detour I-5 NB to SR 500 EB to allow tunnel const	20d	05-20-16	06-17-16	25d		5H1270, 5H1030	5H1340
5H1330	5d/Wk ...	Begin construction SR 500 WB to I-5 NB	160d	05-24-16	01-10-17	45d		5H1310	5H1370
5H1340	5d/Wk ...	Shift 39th to new partial structure	2d	06-20-16	06-21-16	25d		5H1320	5H1350
5H1350	5d/Wk ...	Demo remaining 39th oxing and temp structure	20d	06-22-16	07-20-16	25d		5H1340	5H1360
5H1360	5d/Wk ...	Construct remainder 39th oxing	140d	07-21-16	02-07-17	25d		5H1350	5H1370
5H1370	5d/Wk ...	End Stage 3	0d		02-07-17	25d		5H1360, 5H1330	5H1410
Stage 4			100d	02-08-17	06-28-17	25d			
5H1410	5d/Wk ...	Construct I-5 detour in NB lanes	20d	02-08-17	03-07-17	25d		5H1370	5H1430, 5H1440, 5H1420
5H1420	5d/Wk ...	Construct 39th St under traffic	40d	03-08-17	05-02-17	65d		5H1410	5H1450
5H1430	5d/Wk ...	Begin const I-5 SB to 500 tunnel & grade under 500 WB	80d	03-08-17	06-28-17	25d		5H1410	5H1450
5H1440	5d/Wk ...	Continue construction SR 500 WB to I-5 NB	80d	03-08-17	06-28-17	25d		5H1410	5H1450
5H1450	5d/Wk ...	End Stage 4	0d		06-28-17	25d		5H1430, 5H1440, 5H1420	5H1510, 5H1520
Stage 5			182d	06-29-17	03-16-18	25d			
5H1510	5d/Wk ...	Shift SR 500WB to I-5 SB over new tunnel	2d	06-29-17	06-30-17	45d		5H1450	5H1530
5H1520	5d/Wk ...	Shift I-5 to detour	2d	06-29-17	06-30-17	25d		5H1450	5H1540
5H1530	5d/Wk ...	Continue construction SR 500 EB tunnel under SR 500 WB	160d	07-03-17	02-16-18	45d		5H1510	5H1550, 5H1570
5H1540	5d/Wk ...	Construct I-5 SB to SR 500 EB tunnel in I-5 SB lanes	180d	07-03-17	03-16-18	25d		5H1520	5H1560
5H1550	5d/Wk ...	Construct SR 500 WB to I-5 SB accel ramp	100d	08-01-17	12-20-17	85d		5H1530	5H1570
5H1560	5d/Wk ...	Construct I-5 SB thru 39th St area	60d	12-21-17	03-16-18	25d		5H1540	5H1570
5H1570	5d/Wk ...	End Stage 5	0d		03-16-18	25d		5H1560, 5H1530, 5H1550	5H1610, 5H1620, 5H1630
Stage 6			60d	03-19-18	06-11-18	187d			
5H1610	5d/Wk ...	Construct I-5 detour in SB lanes	20d	03-19-18	04-13-18	25d		5H1570	5H1710
5H1620	5d/Wk ...	Construct I-5 NB to SR 500 EB decel lane and 39th off	60d	03-19-18	06-11-18	187d		5H1570	5H1750
5H1630	5d/Wk ...	Construct 39th SB on ramp	60d	03-19-18	06-11-18	187d		5H1570	5H1750
Stage 7			202d	04-16-18	01-30-19	25d			
5H1710	5d/Wk ...	Shift I-5 to detour	2d	04-16-18	04-17-18	25d		5H1610	5H1720, 5H1730, 5H1740
5H1720	5d/Wk ...	Construct remainder SR 500 EB tunnel under NB lanes	200d	04-18-18	01-30-19	25d		5H1710	5H1750
5H1730	5d/Wk ...	Construct I-5 NB vicinity 39th St	60d	07-13-18	10-05-18	105d		5H1710	5H1750
5H1740	5d/Wk ...	Construct SR 500 to I-5 NB accel	100d	07-13-18	12-03-18	65d		5H1710	5H1750
5H1750	5d/Wk ...	End Stage 7	0d		01-30-19	25d		5H1620, 5H1630, 5H1740, 5H1730, 5H1720	5H1810
Stage 8			20d	01-31-19	02-27-19	25d			
5H1810	5d/Wk ...	Complete I-5 widenings and overlays under traffic	20d	01-31-19	02-27-19	25d		5H1750	5H1820
5H1820	5d/Wk ...	SR 500 Construction Complete	0d		02-27-19	25d		5H1810	CN1030
TRANSIT Procurement & Construction			111...	12-31-13	05-17-18	0d			
Transit Procurement			950d	12-31-13	09-20-17	40d			
TR7500	5d/Wk ...	Purchase & Delivery of New LRT Vehicles	950d	12-31-13	09-20-17	40d		AA2145	TR9780
TR7600	5d/Wk ...	OCS Pole, Rail & Special Trackwork Procurement	175d	10-13-14	06-18-15	13d		AA2245, AA2445	TR8400, TR8200, TR8300, TR8500, TR7800, TR7900
Transit Civil - North (Washington)			694d	10-13-14	06-30-17	13d			
TR7700	5d/Wk ...	Relocate / Install Utilities In Washington	240d	10-13-14	09-21-15	28d		AA2445	TR7800, TR9780
TR7800	5d/Wk ...	Construct Vancouver DT Guideway/Track/Civil	346d	06-19-15	10-26-16	13d		TR7600, TR7700, TR5990, TR5800, TR5790, TR5790, AA2445, RW2720, R...	TR8940, TR9140, TR7900, TR9780, TR9500, TR9540, TR9580, TR9660, TR...
TR7900	5d/Wk ...	Construct McLoughlin Guideway/Track/Civil	173d	10-27-16	06-30-17	13d		TR7800, TR7600, AA2445	TR9100, TR9240, TR9500
Transit Civil - South (Oregon & Columbia River Br.)			597d	11-19-14	03-23-17	51d			
TR8000	5d/Wk ...	Relocate / Install Utilities In Oregon	231d	11-19-14	10-15-15	387d		AA2245, RW2600, RW2710	TR8200, TR9360, TR9780
TR8100	5d/Wk ...	Construct H.I. Transit Bridge Structure	462d	11-19-14	09-12-16	51d		Hi1200, Hi1210, Hi1220, Hi1230, AA2245, RW2710	TR8500
TR8200	5d/Wk ...	Construct Expo-Slough Guideway and Rail	154d	06-19-15	01-27-16	239d		TR7600, TR8000, TR5780, AA2245	TR8900, TR8300
TR8300	5d/Wk ...	Construct Slough Bridge Guideway and Rail	77d	01-28-16	05-13-16	239d		TR7600, AA2245, Hi1140, TR8200	TR8980
TR8400	5d/Wk ...	Construct False Floor, Guideway and Rail on River Bridge	170d	06-14-16	02-13-17	0d		TR7600, TR5500, AA2245, RB1990	TR9020, TR9280
TR8500	5d/Wk ...	Construct H.I. Transit Bridge Guideway and Rail	135d	09-13-16	03-23-17	51d		TR7600, TR8100, AA2245	TR9060, TR9200, TR9620
Transit Park & Rides			621d	07-27-15	01-02-18	97d			
TR8600	5d/Wk ...	Construct P&R Structure @ Clark College - 1750 Spaces	346d	07-27-15	12-01-16	97d		AA2445, RW2600, RW2720, AA2645	TR8700
TR8700	5d/Wk ...	Construct P&R Structure @ Mill District - 560 Spaces	231d	07-05-16	05-30-17	97d		TR8600, AA2645	TR8800
TR8800	5d/Wk ...	Construct P&R Structure @ SR14 - 590 Spaces	231d	02-06-17	01-02-18	97d		TR8700, 141540, AA2645	TR9900
Transit Systems			390d	05-06-16	11-15-17	0d			
OCS - Pole Placement & Wire Stringing			371d	05-06-16	10-19-17	19d			
TR8900	5d/Wk ...	Construct Expo-Slough OCS - Pole Placement & Wire Stringing	77d	05-06-16	08-24-16	168d		TR8200, AA2745	TR9360, TR8980
TR8940	5d/Wk ...	Construct Vancouver DT OCS - Pole Placement & Wire Stringing	115d	05-27-16	11-08-16	115d		TR7800, AA2745	TR9780, TR8980
TR8980	5d/Wk ...	Construct Slough Bridge OCS - Pole Placement & Wire Stringing	39d	11-09-16	01-05-17	115d		TR8300, AA2745, TR8900, TR8940	TR9320
TR9020	5d/Wk ...	Construct River Bridge OCS - Pole Placement & Wire Stringing	115d	02-14-17	07-26-17	79d		TR8400, AA2745	TR9620, TR9740, TR9700
TR9060	5d/Wk ...	Construct H.I. Transit Bridge OCS - Pole Placement & Wire Stringing	115d	03-24-17	09-05-17	51d		TR8500, AA2745	TR9780
TR9100	5d/Wk ...	Construct McLoughlin OCS - Pole Placement & Wire Stringing	77d	07-03-17	10-19-17	19d		TR7900, AA2745	TR9780
Signaling and Communications			390d	05-06-16	11-15-17	0d			
TR9140	5d/Wk ...	Construct Vancouver DT Train Signaling & Comms	250d	05-06-16	04-28-17	34d		TR7800, AA2745	TR9780, TR9320
TR9200	5d/Wk ...	Construct H.I. Transit Bridge Train Signaling & Comms	125d	01-06-17	06-30-17	96d		TR8500, AA2745	TR9780
TR9240	5d/Wk ...	Construct McLoughlin Train Signaling & Comms	115d	01-24-17	07-05-17	94d		TR7900, AA2745	TR9780
TR9280	5d/Wk ...	Construct River Bridge Train Signaling and Comms	154d	04-11-17	11-15-17	0d		TR8400, AA2745	TR9780
TR9320	5d/Wk ...	Construct Slough Bridge Train Signaling & Comms	29d	05-01-17	06-09-17	34d		TR8980, TR9140, AA2745	TR9780, TR9360
TR9360	5d/Wk ...	Construct Expo-Slough Train Signaling & Comms	77d	06-12-17	09-28-17	34d		TR8900, TR8000, TR9320, AA2745	TR9780
Transit Maintenance Facility			289d	08-30-16	10-17-17	21d			



Remaining Work
Critical Remaining Work
Actual Work
Remaining Level of Effort ◆
◆ Milestone

Activity ID	Calendar	Activity Name	Rem Dur	Start	Finish	Total Float	Constraint Date	Predecessors	Successors
TR9400	5d/Wk ...	Construct Maintenance Facility Expansion (POTENTIAL SCOPE)	289d	08-30-16	10-17-17	21d		AA2845	TR9780
Transit Station Finishes			141d	04-11-17	10-27-17	13d			
TR9500	5d/Wk ...	Station Finishes @ Clark College	58d	04-11-17	06-30-17	13d		AA2445, TR7800, AA2945, TR7900	TR9540
TR9540	5d/Wk ...	Station Finishes @ 9th Street - Single Platform Northbound	39d	04-18-17	06-12-17	13d		AA2945, TR7800, TR9500	TR9580, TR9660, TR9620
TR9580	5d/Wk ...	Station Finishes @ Mill Dist - Single Platform Southbound	39d	06-13-17	08-07-17	32d		TR9540, AA2945, TR7800	TR9700
TR9620	5d/Wk ...	Station Finishes @ Hayden Island	58d	06-13-17	09-01-17	52d		TR9020, TR9540, AA2945, TR8500	TR9780
TR9660	5d/Wk ...	Station Finishes @ 5th Street	58d	06-13-17	09-01-17	13d		TR9540, AA2945, TR7800	TR9740
TR9700	5d/Wk ...	Station Finishes @ Mill Dist - Single Platform Northbound	39d	08-08-17	10-02-17	32d		TR9020, TR9580, AA2945, TR7800	TR9780
TR9740	5d/Wk ...	Station Finishes @ 9th Street - Single Platform Southbound	39d	09-05-17	10-27-17	13d		TR9020, TR9660, AA2945, TR7800	TR9780
Transit Start Up			128d	11-16-17	05-17-18	0d			
TR9780	5d/Wk ...	Integrated Testing, Burn In & Training	128d	11-16-17	05-17-18	0d		TR7500, TR8000, TR9740, TR9700, TR9100, TR9240, TR7800, TR8940, T...	TR9900
TR9900	5d/Wk ...	Opening / Begin Revenue Service	0d		05-17-18*	0d	05-17-18	TR8800, TR9780