

Oregon Department of Transportation
Least Cost Planning
Progress Report to 2011 Oregon Legislature

January 2011

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Executive Summary

In 2009, the Oregon Legislature passed the Jobs and Transportation Act (JTA). Sections 6 and 7 of the bill direct the Oregon Department of Transportation (ODOT) to develop a least cost planning model and report back on progress made to the Seventy-sixth Legislative Assembly. This directive contained the following (Oregon Revised Statutes 184.653):

- (1) As used in this section, “least-cost planning” means a process of comparing direct and indirect costs of demand and supply options to meet transportation goals, policies or both, where the intent of the process is to identify the most cost-effective mix of options.
- (2) The Department of Transportation shall, in consultation with local governments and metropolitan planning organizations, develop a least-cost planning model for use as a decision-making tool in the development of plans and projects at both the state and regional level.

The steps ODOT has taken to respond to this directive are described in this report. First, ODOT identified a stakeholder committee with wide representation of transportation interests including local governments and metropolitan planning organizations to advise and assist ODOT with the development of a least cost planning methodology. (Because the term “model” has a specific meaning at ODOT, especially referring to travel demand models, ODOT uses the term “methodology” for least cost planning.) The identified committee is the existing Statewide Transportation Improvement Program (STIP) [Stakeholder Committee](#) (SSC). In addition, ODOT intends to consult other transportation stakeholder and advisory groups and offer opportunities for public comment. ODOT has established a [project website](#) where interested parties can review OLCP development information as it becomes available and send comments to staff via email.

Second, ODOT asked this committee to work on the next edition of the Statewide Transportation Improvement Program (STIP) project criteria for several of ODOT’s major programs. Section 17 of the bill describes ten considerations for ODOT to use when developing STIP criteria. These ten considerations seemed quite related to what OLCP will try to achieve when that process is implemented. Consequently, the SSC was asked to help ODOT examine the existing criteria and the ten new considerations and design new criteria for the upcoming STIP that would start to point the way towards OLCP in the future. The new [STIP criteria](#) for the 2012-2015 STIP were approved by the Oregon Transportation Commission (OTC) at their May 2010 meeting.

Third, ODOT released a Request for Information in the fall of 2009 to gather ideas from the consultant community on what a least cost planning development process may entail and what a least cost planning methodology might look like. These helped ODOT think ahead to how its OLCP process should be structured and how the results might be incorporated into the agency’s activities.

Fourth, ODOT contracted with a consultant team to develop a least cost planning discussion paper that reviews recent least cost planning efforts by other transportation agencies. This paper describes least cost planning principles and attributes common to other least cost planning efforts and describes in detail four varied case studies of other transportation agencies' least cost planning methodologies and their use, results, and lessons learned. This [discussion paper](#) was completed in the summer of 2010 and its findings were presented to the SSC and the OTC.

Fifth, ODOT used the information developed in the activities above to contract for consultant assistance with its OLCP development process. The SSC has held six meetings focused on OLCP and has begun to make essential decisions for OLCP, including adopting an OLCP workplan and choosing to focus first on an OLCP designed to enable analysis of effects for a portfolio of possible transportation investments and actions and to further develop it for individual investments later on.

Several important principles for OLCP were identified from the discussion paper research and are helping shape development of the methodology. These include: multiple goals can be compared, a broad range of solutions can be evaluated, stakeholders are engaged in the decision process, and the process can be a useful basis to aid decision-making. ODOT, with committee assistance, intends to develop an OCLP methodology in accordance with these principles that improves its planning and project development procedures, makes decisions more transparent and accountable, and helps ensure that ODOT makes the best use of public funds.

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Introduction

In 2009, the Oregon State Legislature directed the Oregon Department of Transportation (ODOT) to develop a least cost planning methodology to identify the most cost-effective mix of transportation options. ODOT is in the process of developing this methodology with the input of local governments and other transportation stakeholders. The methodology will allow for a more thorough evaluation of the costs and benefits of different possible investments to address problems on the transportation system and a more robust and transparent analysis of possible impacts of different transportation solutions.

ODOT has taken several initial steps to learn more about least cost planning and how it has been implemented or developed since the mid 1990s and begun work to develop an Oregon least cost planning (OLCP) methodology. ODOT has:

- Recruited its widely representative Statewide Transportation Improvement Program (STIP) Stakeholder Committee (SSC) to serve as a project steering committee.
- Worked with the SSC to revise the STIP Project Eligibility Criteria and Prioritization Factors for 2012-2015 STIP to reflect the ten new considerations for STIP criteria. These considerations were listed in the same legislation that directed the least cost planning project and reflect priorities such as efficiency, safety, and environment that OLCP should address as well. The new 2012-2015 STIP criteria begin readying the agency's project selection process to reflect or help implement the OLCP methodology.
- Released a Request for Information to gather ideas from the consultant community about how OLCP might be developed and what it might include.
- Prepared a discussion paper so that the agency and its stakeholders could learn from other transportation agencies' efforts to implement processes similar to least cost planning as defined for Oregon.
- Contracted with consultants experienced with least cost planning or similar efforts to help ODOT and its stakeholders develop an OLCP methodology.

ODOT is working closely with the SSC to answer fundamental framework questions that will shape how OLCP develops. The Committee has adopted a workplan that presents a series of questions in a stepwise process that will allow for continuous development of an OLCP methodology. ODOT has invited key staff of the agency and metropolitan planning organizations to participate in a technical committee to ensure the resulting OLCP can be integrated with current procedures and utilize available information and analysis tools. ODOT will also provide other transportation stakeholders and the general public opportunities for comment and participation in the OLCP development process.

STIP Stakeholder Committee

ODOT has asked the SSC to serve as the project steering committee for OLCP development because of the broad range of transportation interests represented and its long history of successfully working out a shared position on transportation investment decision criteria. The SSC was first established in 2001 to help ODOT find ways to make the STIP development process more transparent and enable wider participation in that process and has met periodically ever since. The SSC has been a successful advisory committee for ODOT and the Oregon Transportation Commission (OTC).

The STIP is ODOT's list of transportation investments to be made during a four-year period. The STIP is developed in accordance with federal rules and regulations and is updated every two years. Major STIP programs, in terms of total cost, include modernization (capacity enhancement), preservation, and state bridge. For these programs and for projects still in development, the SSC develops recommended selection criteria for each STIP update cycle and the OTC approves the final criteria to be used.

SSC accomplishments include:

- Providing recommendations for making the STIP development process more transparent and accessible to stakeholders.
- Drafting the OTC Policy on Formation and Operation of the ACTs to clarify the roles and responsibilities of the ACTs and their participation in the STIP development process.
- Providing the OTC recommended criteria for modernization, preservation, and bridge projects starting with the first Oregon Transportation Investment Act (OTIA I), and then building on these for each of the following STIPs since, beginning in 2004-2007 to the 2012-2015 criteria just completed.

The use of the selection criteria has become well accepted and expected by the ACTs and other stakeholders as it helps both staff and stakeholders understand what is expected for projects selected for funding. The SSC sends a draft of recommend STIP selection criteria for review and comment by the ACTs and other stakeholders before the SSC finalizes its recommended draft and forwards it to the OTC for approval. After approval, the ACTs and similar bodies use the criteria to assist the ODOT Region staff with prioritization of projects, especially for the modernization program.

The SSC currently has 20 members representing a wide range of transportation interests. Members represent freight interests, American Automobile Association of Oregon, business, public transit, Area Commissions on Transportation (ACTs), Metropolitan Planning Organizations (MPOs), cities, counties, other state agencies, and the Federal Highway Administration. ODOT also invited a few new members to join in order to include representatives that may be able to contribute specifically to OLCP development. New members include a representative of Portland General Electric and the Oregon Global Warming Commission.

STIP Project Criteria

STIP Project Eligibility Criteria and Prioritization Factors (STIP criteria) are updated every two years as the STIP update cycle begins, and were needed as work was scheduled to begin on the 2012-2015 STIP

in 2010. Developing a new STIP takes a little over two years from determining funding available and criteria to be used through stakeholder participation to refine lists of possible projects, air quality conformity, and final approval by the Federal Highway and Federal Transit Administrations. The 2012-2015 STIP criteria were approved by the OTC in May 2010.

ODOT asked the SSC to work first on the STIP criteria because of the relationship of the new STIP considerations and the future use of least cost planning. The ten considerations were included as part of instructions to the OTC in the JTA. They direct the agency to consider investments that relieve congestion, improve operations, safety and efficiency, preserve prior investments and reduce the need for additional highway projects, address the needs of freight and the economy, improve livability and promote environmental stewardship including reduction of greenhouse gas emissions.

The ten considerations reflect the purpose of OLCP to compare “direct and indirect costs of demand and supply options to meet transportation goals, policies or both, where the intent of the process is to identify the most cost-effective mix of options” (ORS 184.653) in a transportation decision-making process. They reflect multiple goals that transportation must help address and call for efficiency in transportation investments. The considerations also reflect various current needs that transportation decision-making must address, and OLCP must address, as a transportation decision-making tool.

The SSC was tasked with helping ODOT revise its existing criteria to better reflect the ten considerations and begin to reflect OLCP. The 2012-2015 STIP criteria represent a first step toward a least cost planning perspective.

Request for Least Cost Planning Information

ODOT issued a Request for Information (RFI) regarding least cost planning methodologies and development processes in late 2009. The RFI enabled ODOT to ask the consultant community for the thoughts and ideas to help inform the agency as it started to plan for developing OLCP. The agency wanted to solicit ideas from other agencies and consultants that have worked with similar processes and use these experiences to shape the workplan for developing an Oregon least cost planning methodology.

ODOT quickly learned that there would be no one way to conduct OLCP. There were many ways for ODOT to develop OLCP to meet the definition given and the agency’s goals though it would likely be built up from a benefit-cost comparison basis to include both direct and indirect benefits and costs and reflect multiple goals and policies. ODOT determined that there would be further need to research different applications of least cost planning.

Least Cost Planning Discussion Paper

Early in 2010, ODOT contracted with a consultant team to develop a discussion paper on least cost planning. Several papers had been written on least cost planning for transportation in the early and middle 1990s, but literature was not available on least cost planning between those papers and today. This discussion paper was to focus on what has been learned from other transportation agencies’ efforts to implement least cost planning or a similar evaluation process (very few use the least cost planning term) since those early papers were written. The consultants identified common least cost planning

principles and attributes from the many different least cost planning-type efforts they found and described in detail four case studies.

The discussion paper's objectives were to:

- Provide an overview of the history and applications of least cost planning for transportation.
- Describe and compare different conceptions and applications of least cost planning.
- Discuss the strengths and weaknesses of various applications through case studies and lessons learned.
- Provide a foundation for ODOT and the SSC to continue discussions of OLCP development.

A major finding of discussion paper research was that there are many efforts around the world to implement a process similar to that defined by JTA for OLCP. Examples were found at the regional, state, and national level throughout the states from Washington State to Virginia and abroad from the Netherlands to New Zealand.

From the research, seven common principles of least cost planning were identified and applied to the Oregon context:

- 1) The approach has been used for transportation planning.
- 2) The range of Oregon-specific transportation policy goals and objectives can be addressed.
- 3) The methodology can be applied at the project-specific level, and the collective (multi-project) level.
- 4) Members of the community and decision makers are engaged in the planning and decision-making process.
- 5) The evaluation framework rolls up multiple goals.
- 6) A broad range of possible multi-modal capacity, demand-management, land-use, maintenance, and other planning options can be considered.
- 7) The approach facilitates the adoption of a meaningful, relevant and operationally useful basis for choice.

Six common technical attributes of least cost planning were identified:

- 1) Costs and benefits are measured in terms that facilitate the comparison of planning options (such as monetary-equivalent units).
- 2) The approach makes use of quantitative and qualitative evidence.
- 3) Impacts on the non-users of planning options and projects are estimated.
- 4) Indirect effects, such as changes in local employment and land use, are accounted for.
- 5) Interactions ("synergies") between planning options are considered.
- 6) The approach explicitly accounts for risk and uncertainty in forecasts and cost and benefit calculations.

Four case studies using least cost planning concepts were selected for further consideration. They are well-documented transportation examples and employ key principles and attributes that are important to Oregon. They are diverse in scale (national, statewide, and regional) and content (program and project applications). The case studies chosen were Puget Sound Regional Council's Transportation 2040 Plan, the United Kingdom Department for Transport's New Approach to Appraisal – Refresh, Indianapolis' Central Indiana Transportation Plan, and Virginia DOT's VTrans 2035 plan.

Several common findings were observed throughout the research for the discussion paper and the case studies. For example, there are many different methods to use to accomplish the principles of least cost planning. Also, none of the various methods accomplish all the principles of least cost planning perfectly; each demonstrates a number of strengths and weaknesses. Oregon will have to select or adapt one or more methods to best fit its needs. Further common findings:

- Least cost planning has helped agencies and stakeholders make more transparent and informed decisions.
- Transportation applications have developed in response to each agency's unique mission, mandate, and goals.
- Least cost planning has been applied at both project and system levels.
- Least cost planning applications use a benefit-cost framework.
- Stakeholders have helped improve the tools and the process.
- Both energy and transportation sectors focus successfully on demand management.
- Both have incorporated environmental costs in innovative ways.
- Both have successfully engaged the public.
- Applications have improved over time.

The discussion paper has proved valuable as it provides a survey of methods, accomplishments, strengths, and weaknesses from other transportation agencies' efforts to develop and implement a least cost planning methodology. The discussion paper findings were presented in detail to the SSC in two parts so that the committee and ODOT could consider how the findings may apply to the OLCP effort and make decisions with the benefit with others' experience in similar efforts. The paper was also presented to the OTC for their consideration.

OLCP Development Workplan

ODOT, with concurrence from the SSC, has divided the OLCP development project into three stages. First is deciding what categories of transportation performance the first OLCP methodology will evaluate and determining how the new methodology might be integrated with ODOT's current procedures. Second is developing the specific measures to be used and the methodology for using them. The third stage is implementing the new OLCP methodology.

Work has begun on the first stage of OLCP development, this is expected to take approximately nine months and be complete in the summer of 2011. A consultant team has been contracted for assistance throughout the project. With their help, ODOT has developed a workplan for the project overall and for the SSC to cover during the first stage of OLCP development. Since later stages will depend on information discovered and decisions made in the first stage, the detailed workplans for stages 2 and 3 will be developed as those stages are begun. In addition, throughout the OLCP development process, ODOT will work to ensure that the resulting OLCP methodology works in concert with the products of related efforts such as greenhouse gas reduction planning.

SSC Workplan

SSC work on an OLCP methodology began in earnest at the October 2010 meeting. At that meeting the overall timelines for the project and stage 1 were discussed along with the various tasks planned and

what the members thought might constitute success of the project and questions OLCP should answer. These discussions and information from prior SSC discussions and the least cost planning discussion paper were used to develop the SSC workplan for stage 1 of OLCP development.

The first decisions to shape OLCP were made at the SSC's November 2010 meeting. A workplan was adopted that lays out a series of decisions to be made along a schedule for the next several SSC meetings. These decisions are designed to shape OLCP in a stepwise manner and allow the consultants and the technical working group to continuously progress with their work between SSC meetings. The decisions move from more general to more specific as an OLCP methodology starts to take shape.

A primary decision the SSC was asked to make was whether OLCP should focus first at the transportation plan or project level. Plan level means OLCP is used to evaluate the impacts of multiple possible transportation investments not limited by mode (e.g. highway, transit) or by type of investment (demand management vs. supply or capacity construction). Project level means that OLCP is used to evaluate specific investments individually.

The committee agreed that OLCP would first focus at the plan level so different options to meet various needs in an area could be evaluated together to determine the best investment options. This was an important starting decision because while OLCP general principles would be similar at either the plan or project level, the specific methods may differ. OLCP will not necessarily be limited to one or the other of these choices, but developed to work for the plan level first and later improved to include analysis options that will work for individual project evaluation.

ODOT Workplan

As the SSC completes its stage 1 workplan, ODOT and the consultants are working on other tasks to ensure that OLCP is developed in a way that can be readily incorporated in the agency's activities and ensure that ODOT's partners, stakeholders, and the public have opportunities to participate.

One of ODOT's first tasks is to report on current agency procedures for planning and project development to identify where OLCP can be integrated and improve the current process. In January, staff was interviewed to more fully understand those parts of the agency whose work will likely be impacted by this new methodology. Next, a technical work group including both ODOT and staff from Metropolitan Planning Organizations (MPOs) was established to assist in the technical development of the OLCP methodology.

Additional tasks will be to conduct ongoing outreach within the agency and to include its partners such as MPOs, ACTs, and other agencies, and allow for public comment as the work progresses. Project summaries designed to update interested parties will be produced throughout the project to describe the project in general and decisions made to date. The current project summary is included as Appendix A to this report. The OLCP methodology development project has a page on ODOT's website (<http://www.oregon.gov/ODOT/TD/TP/LCP.shtml>) where interested parties can follow project information and contact staff via email. In addition, ODOT will ensure other opportunities for public participation or comment throughout the project.

Next Steps

The OLCP project is designed overall to move from broad and general to specific. Stage 1 will establish the parameters for the first OLCP methodology and describe how OLCP might integrate with and improve ODOT's current planning and project development procedures. During stage 1, decisions will develop the essential shape of OLCP such as what categories of performance OLCP will evaluate and what kinds of indicators are used to evaluate those categories of performance.

The second stage of OLCP development will determine the specific indicators or methods for measuring performance within the categories and procedures for comparing any indicators that are not measured in dollars. Stage 2 will arrange these individual methods in an overall OLCP framework and will implement the outreach plan developed during the first stage.

The third stage of OLCP will be implementation of the new methodology. This will likely include further outreach, training of staff, and implementing a monitoring program to be able to track how the OLCP methodology is working and what needs further improvement or refinement.

Conclusion

ODOT is actively working to develop a least cost planning methodology. The agency has conducted research to develop further information to help it formulate a workplan for developing the least cost planning process for transportation decision-making that is called for in the JTA. It has established a widely representative stakeholder committee to serve as the project steering committee to ensure the development of a methodology that is as widely understood and supported as possible. The first steps of the OLCP development process have begun with the help of the STIP Stakeholder Committee and consultant advisors.

ODOT recognizes that the initial OLCP methodology will be improved with time and use. The least cost planning discussion paper case studies demonstrate that least cost planning is a process that needs continuous improvement as new things are learned, new priorities for evaluation arise, and new data and analysis tools become available. Throughout the project, staff and consultants will identify and monitor barriers to more a successful or robust OLCP as well as opportunities for future improvements that are not possible to incorporate in the initial OLCP methodology. This will produce a list of possible things to address in future improvements of OLCP.

ODOT and its stakeholders recognize the ability of OLCP to improve transportation decision-making to ensure more transparent and accountable decisions. Decisions made with OLCP can be documented more fully than is currently possible and can more fully take into account the multiple policies and goals that today's transportation investments must meet. ODOT will continue to develop the OLCP methodology as described in this report. The agency looks forward to implementing the methodology to strengthen and improve its decision-making and ensure the best use of public funds to meet various transportation goals and policies such as those described in the Oregon Transportation Plan.

Appendices

A. OLCP Project Update Flier

Update on Oregon's Least Cost Planning Project

NEXT GENERATION
PLANNING TOOL

EXPLORING LEAST COST PLANNING FOR TRANSPORTATION

In an effort to more fully quantify—and therefore identify—the most cost-effective investments, the Oregon legislature provided direction to the Oregon Department of Transportation (ODOT) to develop a least cost planning (LCP) tool for transportation decision making. According to Section 6 of House Bill 2001, least cost planning is:

“a process of comparing direct and indirect costs of demand and supply options to meet transportation goals, policies or both, where the intent of the process is to identify the most cost-effective mix of options. The Department of Transportation shall, in consultation with local governments and metropolitan planning organizations, develop a least-cost planning model for use as a decision-making tool in the development of plans and projects at both the state and regional level.”

The utility industry has used least cost planning to identify the least expensive options for providing sufficient electricity to customers. In that industry, LCP considers a wide variety of demand management

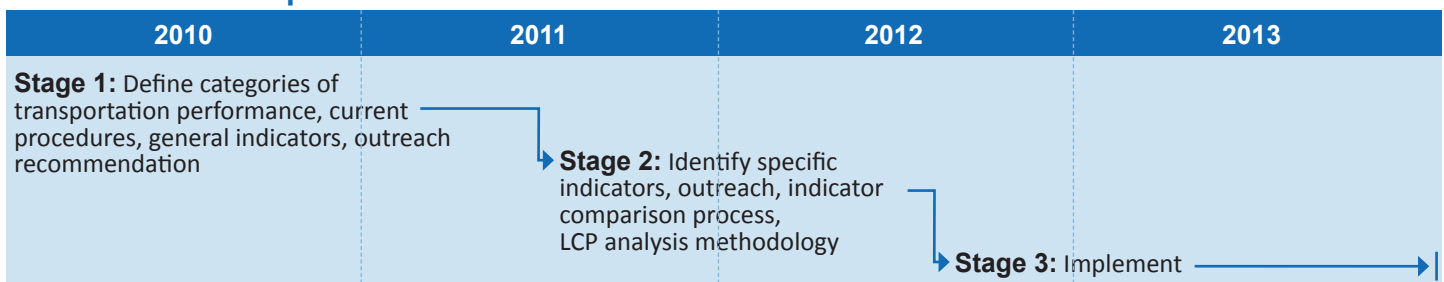
options—from peak period pricing to discounting energy-efficient light bulbs. Because of this success, many have urged that the LCP process be adapted for use in the transportation industry. However, the supply, demand, costs, and benefits for transportation services and facilities are more diverse and complex than for electricity. Oregon’s approach to LCP will reflect these distinctions.

To understand the issues fully, ODOT conducted a survey of agencies that have applied LCP to transportation projects in the United States and around the world. The lessons learned about the opportunities, constraints, and successes of those efforts provide the foundation for the next step, development of an LCP evaluation tool. The results of the survey are summarized in a paper, “The History and Application of LCP for Transportation from the Mid-1990s” (July 2010), available for download on the ODOT Least Cost Planning Website (<http://www.oregon.gov/ODOT/TD/TP/LCP.shtml>).

The focus now has shifted to developing the LCP methodology to be used to help make decisions in Oregon. Though primarily developed for ODOT, this tool may be used by metropolitan planning organizations (MPOs) and other regional bodies and local governments.

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LCP TOOL Development Timeline



▶ WHAT'S HAPPENING NOW?

Work on the first stage of developing the Oregon Least Cost Planning (OLCP) methodology is underway, with plans to deliver a working LCP tool in 2013.

To fully support the contributions and needs of the diverse set of stakeholder interests, ODOT will solicit stakeholder input at each step in the process. Over the coming year, the Oregon LCP process will address these key questions:

- Should Oregon's LCP initially be "project based" or "plan based" (portfolios of projects)?
- What specific environmental, economic, and social transportation system performance measures should be included?
- Which, if any, categories of performance should be expressed in monetary terms, which in other quantitative (numeric) terms, and which in qualitative terms?
- How should demand management options be selected and defined? Demand management includes a wide variety of regulatory, technology, and pricing techniques.
- How can OLCP acknowledge the uncertainties inherent in forecasting and measuring costs and benefits? A variety of techniques (sensitivity analysis, scenario analysis) can be used.

The expected outcome of Stage 1 is a structure for LCP that addresses these questions, explains the proposed uses of OLCP, identifies immediate transportation system performance categories, and defines the scope of what will (and will not) be addressed.

TO FIND OUT MORE

For more information, visit the ODOT TDD LCP website at:

<http://www.oregon.gov/ODOT/TD/TP/LCP.shtml>

▶ WHO IS INVOLVED?

ODOT Transportation Development Division (ODOT TDD) will oversee project development, including management of the technical work and development of recommendations to take to stakeholder and policy-making bodies. ODOT staff are working with a wide range of agencies and stakeholders during Stage 1 of LCP development:

- **STIP Stakeholder Committee (SSC).** This group of approximately 20 people includes representatives from freight, public transit, ports, the Federal Highway Administration, state agency, local government, MPO, and private business. This group was established to provide input to ODOT and the OTC on the development of STIP criteria and LCP. The SSC serves as the project steering committee. ODOT will meet regularly with the SSC to help ensure proposed objectives represent a diverse array of interests.
- **Oregon Transportation Commission (OTC).** The OTC ultimately will provide guidance to ODOT regarding the direction and timing of LCP development. Briefings are planned with the OTC at key milestones throughout project development.
- **Working Group.** The Working Group will consist of transportation agency staff whose expertise is required for successful development and implementation of OLCP. It includes representatives from divisions within ODOT and within the MPOs. Divisions within ODOT represented in this group include the Transportation Planning and Analysis Unit (TPAU), major projects staff, environmental, and region staff.

The public is welcome to participate and comment throughout the process by accessing the project website (see address in the blue box) and attending SSC and other meetings, including meetings of their Area Commission on Transportation (see http://www.oregon.gov/ODOT/COMM/act_main.shtml for ACT information).