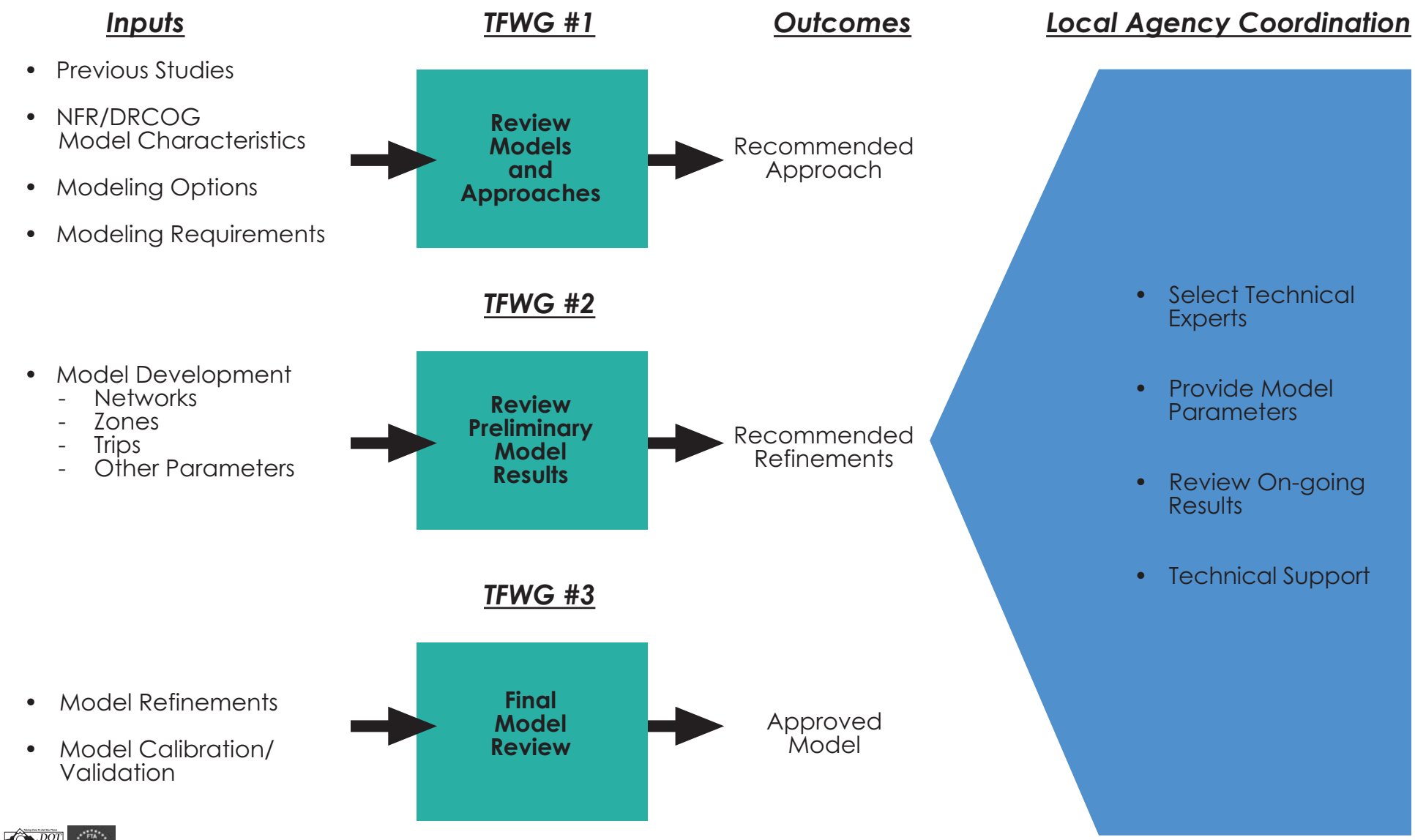
# North I-25 EIS
# Travel Forecasting Process



NORTH I-25 EIS

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# TRAVEL FORECAST WORKING GROUP
## 2004-2005 Roster

| Agency | Representative | Phone | E-mail |
|---|---|---|---|
| CDOT Region 4 | Stan Elmquist | (970) 350-2177 | stanley.elmquist@dot.state.co.us |
| | Bob Garcia | (970) 350-2121 | robert.garcia@dot.state.co.us |
| CDOT DTD | Juan Robles | (303) 512 4815 | juan.robles@dot.state.co.us |
| DRCOG | Erik Sabina | (303) 480-6789 | esabina@drcog.org |
| RTD | David Krutsinger | (303) 299-2436 | david.krutsinger@rtd-denver.com |
| NFRMPO | Andy Gomez | (970) 416-2258 | agomez@nfrmpo.org |
| | John Daggett | (970) 416-6190 | jdaggett@nfrmpo.org |
| | Arvilla Kirchhoff | (970) 224-6147 | akirchhoff @nfrmpo.org |
| City of Fort Collins | Mark Jackson | (970) 416-2029 | mjackson@fcgov.com |
| FHWA | Jeff Houk | (303) 716-2291 | jeff.houk@fhwa.dot.gov |
| Clarion Associates | Darcie White | (970) 419-4740 | bherman@clarionassociates.com |
| FHU | Elliot Sulsky | (303) 721-1440 | Elliot.Sulsky @fhueng.com |
| | Debbie Weaver | (303) 721-1440 | Deborah.weaver@fhueng.com |
| | Chris Fasching | (303) 721-1440 | chris.fasching@fhueng.com |
| MPA | Smith Myung | (303) 260-6487 | smyung@mpamundo.com |
| Carter & Burgess | Jennifer Heisler | (303) 820-4834 | heislerJJ@c-b.com |
| | Brian Hoeschen | (303) 820-4879 | HoeschenBD@c-b.com |
| | Ian Chase | (303) 820-4828 | chaseIG@c-b.com |
| | Chris Primus | (303) 820-4875 | primusCJ@c-b.com |
| Forecasting Expert | Bill Woodford | (703) 645-6812 | wwoodford@aecomconsult.com |
| Forecasting Expert | Bill Davidson | (415) 243-4601 | davidson@pbworld.com |

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# Sign-In Sheet

## Travel Forecast Working Group Meeting
## Friday, February 20, 2004
## Carter & Burgess

| Name | Agency | Address | Phone/E-mail |
|---|---|---|---|
| Jennifer Heisler | C+B | 707 17th St. Suite 2300 | 303-820-4834<br>heislerj@c-b.com |
| JOHN DAGGETT | NFRMPO | 235 Mathews St., Fort Collins, Co | 970 8246190<br>jdaggett@NFRMPO.ORG |
| BILL DAVIDSON | PB Consult | 303 SECOND St, SUITE 700N<br>SAN FRANCISCO, CA 94107 | DAVIDSON@PBWORLD.COM |
| Bill Woodford | AECOM Consult | 2751 Prosperity Ave<br>Fairfax, VA 22031 | 703 645-6812<br>william.woodford@aecomconsult.com |
| Andy Gomez | NFRMPO | 235 Mathews St<br>Fort Collins, CO 80524 | 970-416-2258<br>agomez@nfrmpo.org |
| ELLIOT SULSKY | FELSBURG HOLT & ULLEVIG | 6300 S. SYRACUSE WAY<br>CENTENNIAL 80111 | 303 721 1440<br>elliot.sulsky@fhueng.com |
| MARK JACKSON | City Fort Collins | PO Box 580<br>Fort Collins, CO 80522-0580 | 970-416-2029<br>mjackson@fcgov.com |
| Erik Sabina | DRCOG | 4500 Cherry Creek Drive South<br>Denver, CO 80246-1531 | 303-480-6789<br>esabina@drcog.org |
| | | | |
| | | | |

# Sign-In Sheet

## Travel Forecast Working Group Meeting
## Friday, February 20, 2004
## Carter & Burgess

| Name | Agency | Address | Phone/E-mail |
|---|---|---|---|
| David Krutsinger | RTD | 1600 Blake St Denver CO 80202 | 303.299.2436 david.krutsinger@rtd-denver.com |
| Chris Fasching | FHU | 6300 S. Syracuse Way, St. 600 Centennial, CO 80111 | 303-721-1440 Chris.Fasching@FHUENG.COM |
| Smith Myung | MPA | 600 17th Street, Suite 2800 South Denver, CO 80202 | 303-260-6487 smyung@mpamundo.com |
| Ian Chase | C&B | 707 17th St. Ste 2300 Denver CO 80202 | 303-820-4828 chaseig@c-b.com |
| Aruilla Kirchhoff | NFRMPO | 235 Mathews Fort Collins, CO | 303 224-6147 akirchhoff@nfrmpo.org |
| Bob Garcia | CDOT | 1402 2nd Street Greeley 80631 | 970-350-2121 robert.garcia@dot.state.co.us. |
| Darcie White | Clarian | ten 1700 Broadway Suite 400 Denver 80290 | 303 830 2090 dwhite@clarianassociates.com |
| Jan Robles | CDOT | 1125 S. Colorado Blvd #606 Denver, CO 80222 | jan.robles@dot.state.co.us |
| | | | |
| | | | |

# TRAVEL FORECAST WORKING GROUP
# 2005-2006 Roster

| Agency | Representative | Phone | E-mail |
|---|---|---|---|
| CDOT Region 4 | Stan Elmquist | (970) 350-2177 | stanley.elmquist@dot.state.co.us |
| | Bob Garcia | (970) 350-2121 | robert.garcia@dot.state.co.us |
| CDOT DTD | Juan Robles | (303) 512 4815 | juan.robles@dot.state.co.us |
| DRCOG | Erik Sabina | (303) 480-6789 | esabina@drcog.org |
| | Greg Erhardt | (303) 455-1000 | gerhardt@drcog.org |
| RTD | David Krutsinger | (303) 299-2436 | david.krutsinger@rtd-denver.com |
| NFRMPO | Andres Gomez | (970) 416-2258 | agomez@nfrmpo.org |
| | John Daggett | (970) 416-6190 | jdaggett@nfrmpo.org |
| | Arvilla Kirchhoff | (970) 224-6147 | akirchhoff @nfrmpo.org |
| City of Fort Collins | Mark Jackson | (970) 416-2029 | mjackson@fcgov.com |
| | Kurt Ravenschlag | (970) 416-2040 | kravenschlag@fcgov.com |
| FHWA | Jeff Houk | (303) 716-2291 | jeff.houk@fhwa.dot.gov |
| Clarion Associates | Darcie White | (970) 419-4740 | bherman@clarionassociates.com |
| FHU | Elliot Sulsky | (303) 721-1440 | Elliot.Sulsky @fhueng.com |
| | Debbie Weaver | (303) 721-1440 | Deborah.weaver@fhueng.com |
| | Chris Fasching | (303) 721-1440 | chris.fasching@fhueng.com |
| MPA | Smith Myung | (303) 260-6487 | smyung@mpamundo.com |
| Carter & Burgess | Jennifer Heisler | (303) 820-4834 | heislerJJ@c-b.com |
| | Brian Hoeschen | (303) 820-4879 | HoeschenBD@c-b.com |
| | Ian Chase | (303) 820-4828 | chaseIG@c-b.com |
| | Chris Primus | (303) 820-4875 | primusCJ@c-b.com |
| Forecasting Expert | Bill Woodford | (703) 645-6812 | wwoodford@aecomconsult.com |
| Forecasting Expert | Bill Davidson | (415) 243-4601 | davidson@pbworld.com |

# TRAVEL FORECASTING WORKING GROUP

## 2010 ROSTER

| AGENCY | REPRESENTATIVE | E-MAIL |
|---|---|---|
| **CDOT REGION 4** | Carol Parr | Carol.Parr@dot.state.co.us |
| | Long Nguyen | long.nguyen@dot.state.co.us |
| **CDOT DTD** | Juan Robles | juan.robles@dot.state.co.us |
| **CLARION ASSOCIATES** | Darcie White | dwhite@clarionassociates.com |
| **DRCOG** | Erik Sabina | ESabina@drcog.org |
| | Suzanne Childress | schildress@drcog.org |
| **Felsburg Holt and Ullevig** | Holly Buck | Holly.Buck@FHUENG.COM |
| | Elliot Sulsky | Elliot.Sulsky@FHUENG.COM |
| **FHWA** | Eric Pihl | eric.pihl@dot.gov |
| **FTA** | Larry Squires | larry.squires@dot.gov |
| **JACOBS** | Chris Primus | Chris.Primus@jacobs.com |
| | Keith Borsheim | Keith.Borsheim@jacobs.com |
| **NFRMPO** | Arvilla Kirchhoff | AKirchhoff@nfrmpo.org |
| | Suzette Mallette | SMallette@nfrmpo.org |
| **RTD** | Jeet Desai | Jeet.Desai@rtd-fastracks.com |
| | Lee Cryer | Lee.Cryer@rtd-fastracks.com |

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# NORTH I-25 FRONT RANGE EIS
## Travel Forecast Working Group Meeting #1
## February 20, 2004, 9:00 a.m.
## Carter & Burgess

## AGENDA

| | | Times |
|---|---|---|
| 1. | Introductions | 9:00 |
| 2. | Review of Notebook Contents | 9:10 |
| 3. | Consideration of Model Options | 9:45 |
| | ▸ Expert Observations/Recommendations | |
| 4. | Recommended Approach | 11:00 |
| 5. | Schedule/Milestones/Meeting Dates | 11:30 |
| 6. | Lunch | 12:00 |
| | ▸ Land Use Forecasting Needs and Approaches | |

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# DRAFT Meeting Minutes

**Project:** North I-25 Front Range EIS

**Purpose:** Travel Forecast Working Group Meeting #1

**Date Held:** February 20, 2004

**Location:** Carter & Burgess

**Attendees**:

| | |
|---|---|
| **CDOT:** | Bob Garcia |
| | Juan Robles |
| **NFRMPO:** | John Daggett |
| | Arvilla Kirchhoff |
| | Andy Gomez |
| **City of Fort Collins:** | Mark Jackson |
| **DRCOG:** | Erik Sabina |
| **RTD:** | David Krutsinger |
| **PB Consult:** | Bill Davidson |
| **AECOM Consult:** | Bill Woodford |
| **FHU:** | Elliot Sulsky |
| | Chris Fasching |
| **MPA:** | Smith Myung |
| **Clarion:** | Darcie White |
| **Carter & Burgess:** | Jennifer Heisler |
| | Chris Primus |
| | Ian Chase |

**Copies:** Attendees, File#071609.400

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## SUMMARY OF DISCUSSION:

1. Chris welcomed everyone, and introductions were made.

2. Chris led a brief review of the entire contents of the TFWG Information Notebook. Comments included:

   - The Activity Area map needs to be updated appropriately as new information becomes available.

   - Rail Issues: Firestone/Frederick has purchased some of the abandoned railroad right-of-way. Details were not known.

   - DRCOG roadside survey. The travel survey endpoints may have been re-geocoded. Erik will check to see if this is the case.

   - TAFS. It is important to explain to the public that TAFS was a first step, and not as thorough as an EIS.

- NFRMPO Model. The 2030 model will be available in Spring 2004, not March 2004.

3. Chris briefly described the model approach options, as outlined in the Information Notebook. Bill Davidson and Bill Woodford described their experiences of combining models, and suggested a synthesized approach that would be appropriate for this project. Chris handed out an outline (attached) describing this approach, which involves:

    - Applying the NFRMPO and DRCOG models separately.
    - Creating a separate submodel for inter-regional trips.
    - Using a single integrated mode choice model, based primarily on the DRCOG model.
    - Providing reasonableness checks and quality control by
        - Applying FTA quality control standards
        - Comparing to other commuter rail systems
        - Using FTA's Summit program as a diagnostic tool

    General comments on the synthesized approach included:

    - The North Front Range model has a nested logit mode choice component that could be used as a basis for the integrated mode choice component. This mode choice is currently calibrated for the Fort Collins area, but could be extended to all of the North Front Range.
    - The details of the NFRMPO mode choice model need to be examined closely, so that use of its parameters can be made as appropriate.
    - It is important to note that people up north perceive themselves as different than Denverites. If the DRCOG model mode choice is used, this could be viewed as inappropriate. Note that people's behavior is similar across different geographies, and so "borrowing" models from other areas can be considered reasonable. The environment can be different, and this is a large influential factor on people's travel behavior.
    - The DRCOG multinomial logit mode choice component currently estimates ridership on Regional routes, which are somewhat similar to the long inter-regional trips that must be considered in this EIS. The adequacy of the model for ridership on these Regional routes needs to be compared to Ridecheck data.
    - The DRCOG mode choice model has a rail-specific coefficient. While the FTA discourages this, it is usually acceptable if all other model options have been attempted, and the area has a rail system in place that can be used as a calibration basis.

- Unnecessary segmentation should be avoided in the model. For example, the creation of a long trip purpose would cause an arbitrary barrier between short trips and long trips.

- It was noted that the DRCOG mode choice application is in standard TransCAD; the North Front Range mode choice is in direct GISDK programming. The provision of input to the FTA Summit procedure is currently not possible with the standard TransCAD application.

- Note inter-regional trip lengths vary greatly between the various cities. The model must not have discontinuities so that these trips are modeled appropriately.

- The September deadline is a large constraint on the model development process. The choice of model structure is influenced by this constraint. As the model development proceeds, decisions will have to be made to make sure the deadline is met.

- Coordination with other on-going corridor plans is an important issue. The US-36 EIS underway is the most pertinent for this project.

4. Chris said he would refine the outline of the suggested model approach and distribute it the following week.

5. Darcie led a discussion of the envisioned land use process. The basis will be the 2030 land use data sets of the MPO's. It was noted that adopted 2030 land use data sets will not be available until late 2004 or early 2005.

    - Alternative-specific land use sets can be prepared for use only as sensitivity runs, because the FTA does not accept anything other than the official adopted land use data sets.

    - It was noted that transit-oriented developments (TOD) near commuter rail stations have different characteristics than TOD near light rail stations.

    - Recommendation was to develop a range for land use scenarios with rail based on experience in other areas.

6. Jennifer led a review of the key notes and comments discussed during the meeting

    <u>Additional Data Needs Identified During the Meeting</u>

    - Vanpool program information regarding ridership and destinations. Available from RTD's NTD

    - Is more detail available from the DRCOG Roadside survey regarding destination locations?

    - What is RTD's experience with destinations of the current Southwest LRT? Is it mostly the Denver CBD?

- A commuter rail fact sheet is needed to educate the public on the characteristics of commuter rail versus other modes.
- Actual traffic counts at the model's common boundaries.
- Model calibration standards, published by the Ohio Department of Transportation (available online).
- Confirm the limits and intended use of the abandoned railroad right-of-way purchased by Frederck/Firestone.
- Check with DRCOG to determine if roadside survey geo-coding has been updated.
- Confirm the number of trains per day between Mead and Johnstown.
- Refine the trip purpose categories of the roadside survey.

Modeling Issues

- How to handle wait times?
    - Suggest differential coefficients for first wait
    - Separates convenience from true wait time
- Mid-day service makes large difference in commuter rail mode share
- Need to modify mode split equations for long trips?
- How well does DRCOG model predict ridership on current long-distance regional routes? RTD will provide Ridecheck data.
- Is TransCAD standard logit model McFadden or Daly?
- Does DRCOG model have Summit interface?
- How important is it to incorporate "HOT" + toll lanes into mode choice model?
- Mode choice models for "HOT" lanes predict "tendency" to take toll lanes
- Are I-E's synthetically developed or expanded from survey results?
- DRCOG new TransCAD model does contain rail specific coefficients
- DRCOG mode choice model performed in standard TransCAD module
- Need to examine NFR mode choice model and see how it can be used (maybe use both mode choice models)

- NFR mode choice model is only calibrated for Ft. Collins – may require adjustments/calibration – for Greeley and Loveland

Modeling Suggestions

- Use of "reasonableness comparisons"
    - Other commuter rail/transit systems
- AECOM/PB Research – for FTA
    - On-board commuter rail/light rail surveys
    - Corridor-level densities
    - Skims
    - Trip lengths
    - Mode of access
- Consider examination of truck freight movements
- Avoid unnecessary segmentation
    - i.e., "long trips" are not a trip purpose
- Examine survey methods –
    - NFR – HH
    - DRCOG – roadside
- Coordinate with US 36 EIS team re: Ridership from North I-25 (BNSF)
- (Total NFR Work Trips) * (percent to Denver CBD) * (assumed transit mode split) = approximate commuter rail ridership estimate
- NTI Course – April 28th – 30th in Raleigh/Durham – Multimodal Travel Demand Forecasting (taught by Bill Davidson and Jim Ryan)

Issues

- Community expectations – TAFS results (forecasts)
- Clearly explain process/results of forecasting (policy makers)
- Consider "error ranges" of forecasts
- Travel behavior characteristics are similar – environment is different (mode split models)

7. ACTION ITEMS

- NFRMPO: Provide vanpool program information regarding ridership and destinations (or confirm source).
- DRCOG: Determine if more detail is available from the DRCOG Roadside survey regarding destination locations.
- RTD: Describe destinations of the current Southwest LRT. Is it mostly the Denver CBD?
- Carter & Burgess: Prepare commuter rail fact sheet describing the characteristics of commuter rail versus other modes.
- Carter & Burgess: Obtain actual traffic counts at the model's common boundaries.
- Carter & Burgess: Obtain model calibration standards, published by the Ohio Department of Transportation (available online).
- Carter & Burgess: Confirm the limits and intended use of the abandoned railroad right-of-way purchased by Frederick/Firestone.
- DRCOG: Determine if roadside survey geo-coding has been updated.
- Carter & Burgess: Confirm the number of trains per day between Mead and Johnstown.
- Carter & Burgess: Refine the trip purpose categories of the roadside survey.
- RTD: Provide Ridecheck data for Regional Routes, and compare to current model assigned boardings.
- MPA: Determine if standard TransCAD logit procedure is McFadden or Daly.
- DRCOG: Determine if the Internal-External model is synthetically derived or expanded from survey results.
- Carter & Burgess: Provide more details on the roadside survey.
- Carter & Burgess: Provide refined "synthesized approach" for review to TFWG.

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**Attachment**

# Model Options

Synthesized Approach

1. Maintain Integrity of Individual MPO Models
   - Trip generation
   - Trip distribution

   } DRCOG purposes for mode choice
2. Separate Inter-Regional Model
   - Use internal/external trip tables to create person trips tables (convert from vehicles to person trips)
   - Use roadside survey to stratify by trip purpose
3. One Integrated Set of Networks
   - Skims
   - Assignment
4. Single Integrated Mode Choice Model
   - DRCOG mode choice model provides foundation
   - Expanded transit nest (if required/appropriate)
5. Reasonableness Comparisons/Quality Control
   - FTA quality control standards
   - Comparisons with other systems
   - Use Summit as diagnostic tool
6. Validation Basis
   - Van pool programs – NFR
     DRCOG
   - Ridership estimates for RTD's existing regional routes
   - Actual traffic counts – model cordon boundaries and other areas

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# SIGN IN SHEET

## Travel Forecast Working Group Meeting
## Wednesday – April 21, 2004
## Carter & Burgess

| Name: | Department: | Specialty: | E-Mail Address: |
|---|---|---|---|
| Stan Elmquist | CDOT R4 | Planning Env. | stanley.elmquist@dot.state.co.us |
| Jennifer Heisler | CTB | Transp. Plng | heisterjj@c-b.com |
| Darcie White | Clarion Assoc. | Land Use | dwhite@clarionassociates.com |
| Juan Rables | CDOT DTD | Travel Demand | juan.rables@dot.state.co.us |
| Bob Garcia | CDOT R4 | Traffic | robert.garcia@dot.state.co.us |
| John Daggett | NFRMPO | Comedy | jdaggett@nfrmpo.org |
| Andres Gomez | NFRMPO | Travel Demand Model | agomez@nfrmpo.org |
| Erik Sabina | DRCOG | " " | esabina@drcog.org |
| David Krutsinger | RTD | Travel Demand & Bicycles | david.krutsinger@rtd-denver.com |
| Brian Hoeschen | C+B | Data Management/GIS | hoeschenbd@c-b.com |
| Smith Myung | MPA | Travel Demand Model | smyung@mpamundo.com |
| Chris Primus | CTB | " | primuscj@c-b.com |
| | | | |

**North I-25 EIS Project Office**
2207 East Highway 402
Loveland, Colorado 80537
(970) 352.5455
(303) 779.3384
www.cdot.info/northi25eis

NORTH I-25 EIS
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## Travel Forecast Working Group Meeting
## April 21, 2004
## 9:00 am
## Carter & Burgess Office

# AGENDA

1. Brief Follow-up of TFWG #1 Action Items
2. Review of Model Approach
3. Combined Framework of Zone Systems and Networks
4. Trip Table Development
5. TAC Discussion Items
   - Survey
   - Local Review
   - Trucks
6. Express Lanes
7. Induced Demand
8. Next Steps

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# MEETING MINUTES

## Travel Forecast Working Group #2

| | | |
|---|---|---|
| MEETING DATE: | April 21, 2004 | |
| LOCATION: | Carter & Burgess | |
| ATTENDEES: | CDOT: | Bob Garcia<br>Juan Robles<br>Stan Elmquist |
| | NFRMPO: | John Daggett<br>Andy Gomez |
| | DRCOG: | Erik Sabina |
| | RTD: | David Krutsinger |
| | MPA: | Smith Myung |
| | Clarion: | Darcie White |
| | FHU: | Elliot Sulsky |
| | Carter & Burgess: | Jennifer Heisler<br>Chris Primus<br>Brian Hoeschen |
| PREPARER: | Carter Burgess<br>Jennifer Heisler | |
| COPIES: | Attendees, Becky Noe, File | |

## MEETING SUMMARY

1) Chris Primus welcomed everyone.

2) The Action Items from the TFWG #1 meeting were handed out.

- Vanpool and ridership – a handout was provided showing the number of vans and riders for Fort Collins, Greeley, and Loveland, and the origins and destinations of the vanpools.
- DRCOG Roadside Survey detail - a summary was provided.
- Destinations of current SW LRT – 75% were destined to CBD, 10% to Englewood/ Littleton, and 9% to Broadway/Evans/Alameda.
- Fact Sheet – Commuter Rail and Light Rail was handed out.
- Traffic counts – on-going.
- Model Calibration Standards – obtained standards from Ohio DOT.

- Abandoned railroad ROW – Firestone purchased 9.3 miles, and Frederick purchased 1 mile.
  - ◊ How much width was purchased?
  - ◊ Is there any left?
  - ◊ John Daggett thinks the ROW purchased does not provide options for other uses. John will get a copy of the report to C&B.
- Roadside survey geocoding – C&B has latest.
- Confirm number of trains between Mead and Johnstown – information requested.
- Refine trip purpose categories of roadside survey – underway.
- Ridership data – modeled versus actual for RTD regional routes – provided.
  - ◊ Ranges between 12% to 101%
  - ◊ Corridor level
  - ◊ More accurate than route level.
- TransCAD logit procedure is Daly, not McFadden.
- DRCOG I-E model - is synthetically derived (sensitive to land use).
- Details on roadside survey – attachment.
- Provide "synthesized approach" – discussion item/hand out.

3) Forecast Model Approach

- Hand-out/write-up of approach provided.
- Maintain all attributes of each MPO zone system and network.
- Create common set of attributes for combined system.
- Trip purposes for Bi-Regional trips – plan to use DRCOG purposes (3) instead of NFR purposes (6) to simplify.
- Special Generators – DRCOG has developed trip generation rates that reflect "typical" days rather than develop special rates for numerous locations. Two special generators remaining: Auraria and DIA.
  - ◊ NFR – two special generators are CSU, UNC.
- Mode choice – not sure if will use DRCOG or NFR model choice models – will seek guidance from the modeling experts.
- Assignment
  - ◊ Issues – number of iterations
  - ◊ Time of day – DRCOG has 10 periods, NFR has three.

- ◊ Will investigate options to reduce number of periods – perhaps combines two "shoulder" hours in the peak, or lump mid-day trips together to reduce number of iterations. Concern is time required to run model. DRCOG model takes 12 hours now.

- Mode split issue – both models were calibrated to shorter trip purposes. Need to determine an approach to account for longer transit trip purposes.

4) Combined zone systems and networks

- Overlap between models is minimal
  - ◊ What is total land use in overlap area? Number of HH and employment? C&B will check.
  - ◊ Group agreed that land use was probably not large.
  - ◊ Agreed that could use NFR zone totals for I-I trips in area where overlap is exact.
- Networks – will eliminate duplicate links in models in overlapping areas – identified five areas where this approach is required.

5) Bi-Regional Trip Table

- Will fold trips from unmatched external stations into major highways.
- Plan to "link" each model's I-E distribution for trips at external stations.
- Will check distribution at RSA level using TBI data for trip length frequency and purpose.
- Purpose – will apportion trips into purposes (roadside survey information). This will also include trucks.
- Trip length – will use distance skims to compute the trip length frequency distribution. Trips will be factored to match observed trip length.

6) 2030 – need to get annual growth rates for external stations for each MPO model and compare what assumptions were used. This will provide a first cut analysis of future year consistency.

7) TAC Discussion Items

- Surveys – concern if surveys were recent. Handout showing coverage of two MPO surveys.
  - ◊ Surveys help understand behavior, would only need to redo survey if there is a fundamental change in behavior, i.e., willingness to commute a long distance.
  - ◊ Issue equal long term acceptability of results.
  - ◊ Message equal gap OK in survey areas because behavior of people in these areas most likely similar to adjacent areas.
- Local review – request to review results (locals)
  - ◊ Agreed that review should take place on MPO models, as this model will duplicate MPO results. Most important element to this effort is Bi-Regional trip distribution.

# MEETING MINUTES

*Travel Forecast Working Group #2*
*April 21, 2004*
*4 of 4*

- Trucks
  - ◊ Current approach based on observed patterns and is related to land use. Does not assume major shifts in freight distribution patterns/mode.
  - ◊ E/I, E/E trip table, DRCOG, do not separate autos from trucks.
  - ◊ Important to have distribution of trucks (by classification) as input into noise analysis.

8) Express Lanes (hand-out of meeting minutes, CTE)

- Colorado Tollway Enterprise – examining corridors statewide.
  - ◊ Will screen down to a smaller number for more detailed evaluation.

9) Induced Demand

- Induced growth (i.e., development) and demand (change in travel behavior).
- Gina McAfee is preparing methodology for addressing induced growth; Chris Primus is also preparing method to evaluate induced demand. Chris is working with DRCOG.
  - ◊ Key item may be assumed growth rate in external station volumes (not currently related to land use) – i.e., productions are fixed.
  - ◊ Does induced demand vary by mode?

10) Next meeting – anticipate in May 2004, plan to bring in modeling experts.

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# MEETING MINUTES

## Travel Forecast Technical Meeting

| | |
|---|---|
| MEETING DATE: | June 9, 2004 |
| LOCATION: | Carter & Burgess |
| ATTENDEES: | AECOM: Bill Woodford<br>PBConsult: Bill Davidson<br>MPA: Smith Myung<br>FHU: Elliot Sulsky<br>Carter & Burgess: Chris Primus<br>Brian Hoeschen |
| PREPARER: | Carter Burgess<br>Chris Primus |
| COPIES: | Attendees, Jennifer Heisler, Becky Noe, File |

## MEETING SUMMARY

1) Chris Primus welcomed everyone.

2) Chris and Brian reported on the merging of the zone system and network. Chris distributed a graphic depicting the overall scheme for combining the models. A detailed technical memorandum was distributed that describes the process of the merging effort. The combined system has a total of 3,479 zones, with a few in an overlap area. The socioeconomics of the overlap zones from the two MPOs matched nicely. Similarly, a combined network has been merged into TransCAD. The link attributes from both networks have been maintained.

   - Bill W. suggested checking the network for pathbuilding by testing shortest paths across each of the joined links at the common border. Similarly, pathbuilding for transit needs to be checked.
   - Bill W. suggested the DRCOG route system soon be brought into the combined network as well, since it relies on link IDs.

3) The development of the trip table was discussed at length. Chris and Brian reviewed the process step by step, as described in a technical memorandum that was distributed. Some of the issues discussed included:

   - The unknown trips from the roadside survey were factored out for the bi-regional trip table during the splitting into trip purpose step. On I-25, these are a particularly large portion of the observed trips from the roadside survey. A check needs to be made to be sure that this has not caused an overstatement of the total trips by 10%.
   - Trucks, which have been factored out of the bi-regional trip table, need a trip table for assignment purposes.
   - The super-external trips need a trip table for assignment purposes.

- Trip length frequency distributions before and after distance factoring were reviewed. There was concern about the magnitude of the factoring that was required. It was suggested that the model's original internal-external trip lengths could be checked, but it was acknowledged that these are half-trips and the linking of the trip halves was relatively random, and so no information exists to cross-check the trip lengths.
- A table, aggregated by RSA to RSA, showing the trips from the developed model trip table, showing the trips from the roadside survey, and also showing journey-to-work trips from the CTPP was reviewed at length. The table is a first draft and needs to be further reviewed for quality control.
    - ◊ The totals of all trips and work trips do not match well among the three. The CTPP total seems to indicate more work trips than the roadside survey, by a significant order of magnitude. This needs to be researched thoroughly.
    - ◊ Quickly looking at the county-to-county worker flow data also reveals a large disparity in work trips compared with the roadside survey.
    - ◊ When the CTPP data were factored by 1.7 to get an equivalent HBW trip estimate, the number of work trips implied by the CTPP was significantly higher. Bill Woodford suggested that perhaps a factor of 1.5 to 1.7 is appropriate only for urban areas. A factor of 1.0 may be more appropriate in rural.
    - ◊ The distribution also does not seem appropriate, since there was a notable lack of similarity of trips between RSAs.
- It is possible the small sample size of the roadside survey is causing some of the distribution comparisons problems. The actual sample size of the roadside survey per RSA should be displayed alongside the data. To overcome this problem, it may be desirable to use larger RSAs.
- It was decided that matching observed data is most important, rather than matching the model internal-external data.
    - ◊ A trip table of work trips should be developed from the census tract CTPP data. Allocation among zones can be accomplished by using the number of workers at the household (households could be used if workers is not available) for the production end, and by employees at the attraction end. This will take care of directionality.
    - ◊ The home-based other and non-home based trip tables should be developed from the roadside survey data.
    - ◊ An alternate approach would also use the roadside survey for the work trips. Both tables could be developed, and an assignment of each table to the roadway network could be used to gauge which one is most appropriate.
- Chris reported that the total JTW trips from the north MPO area to the Denver CBD were 1,118. It was acknowledged that this was a very low number. A commuter rail system needs a large mass of trips attracted to one end to be a viable system. Chris will check this number again, but will bring this issue to the attention of the project team.

- The "story" of trip table markets is important to relay to the project team.

4) A method to develop a future year bi-regional trip table was discussed. Chris handed out a table showing each respective MPO's growth rate factor for the external stations along the common border. It was uncertain how each MPO had developed these growth rates. A simple trend line approach may not be appropriate as the spread of development merges the two areas. Of course, use of the MPO numbers is a defensible approach. The two Bills suggested an alternate method to develop the future trip table for this project.

   - Obtain the pre-balanced P's and A's from each respective model (2030).
   - Apply the I-E growth rate to the bi-regional to obtain the 2030 total of each bi-regional zone.
   - For each zone, total the 2030 MPO internal trip number with the 2030 IE trip number, and obtain the 2030 row and column marginals.
   - Apply a fratar process to grow the entire 2000/2001 combined trip table to 2030 using our 2030 row and column marginals (right?).
   - Replace the internal MPO portions of the combined trip table with the originals from the two models.
   - Check the resulting future volumes that are produced by the bi-regional trip table to make sure they produce a growth rate that is close (and probably slightly higher) than the MPO external station growth rates.

5) The options for handling mode choice were discussed in detail.

   - The DRCOG situation of needing to recalibrate their new model to address FTA concerns was discussed at length.
   - The mode choice element needs to be selected based on the primary attraction end of transit trips. Since the Denver CBD is the primary destination market for work trips from the northern area, the DRCOG model mode choice routine needs to be the basis for the combined model for the EIS.
   - For trips to the northern area, the Fort Collins mode choice could be used. But this was not recommended, for the following reasons:
     - ◊ Application of the model would be more difficult due to two different mode choice routines.
     - ◊ The coefficients and constants of the Fort Collins mode choice model were examined. Bill Davidson suggested that the FTA may not accept these values, and so the Fort Collins mode choice need to be recalibrated in a similar manner as DRCOG
     - ◊ The Fort Collins mode choice is not currently structured or calibrated for regional transit trips. Furthermore, rail trips in the Fort Collins mode choice cannot be calibrated using observed data. The DRCOG area has an existing rail line for calibrating rail activity in the model.
   - It is sensible to wait for DRCOG to recalibrate their model before its use in this project. It would be inefficient and impractical to simultaneously and independently develop an acceptable mode choice routine

for this project. In the end, it will need to be the same as the DROCG calibrated mode choice to be acceptable, to the FTA and others. DRCOG has stated that recalibrated model should be available in about 2 months. It is not known the certainty of this schedule.

- In the meantime, a sketch model approach could be used for initial screening of rail alternatives. Bill W. offered a GIS-based routine that could fulfill this function.
- The base transit network (the addition of the north MPO area local routes) can be coded in the meantime into TransCAD.

6) Pathbuilding must correspond to the mode choice routine. The DRCOG pathbuilding assumptions will be used.

7) Traffic assignment was discussed. A combined routine must be employed. No zone partitioning is. The traffic assignment routine that is calibrated for the most congestion needs to be selected (an assignment routine that is calibrated for less congestion may not function for heavily congested roadways). Therefore, the DRCOG traffic assignment routine will be used.

- Time-of-day, link capacities, free-flow assumptions, and volume-delay functions need to be from the calibrated traffic assignment routine.
- The running time could be significant – several days. Adding RAM should help. FHU has two licenses, and MPA has one.

8) Validation needs to be performed for the north area. The data should be available, since the NFRMPO model was recently validated.

9) Modeling of HOV lanes was discussed. Bill Davidson recommends a mode choice routine that properly addresses the travel markets. Bill Woodford pointed out that HOV routines are based on data from two regions that have unusual carpooling characteristics, and further questioned some policy implications of HOV lanes.

- For practicality, it is reasonable to use the DRCOG HOV set of procedures.

10) Toll modeling was discussed. Bill Davidson recommends that toll options be fully built into the mode choice step. Bill Woodford suggested that link based assignment routines are acceptable, since people make decisions as they travel.

- Wilbur Smith is on the team. It was agreed that for a NEPA process, the proprietary methods that Wilbur Smith uses may not be appropriate for the early stages of the EIS.
- The value of time is an important factor. It was noted that it is not tied to household income, since low wage earners may be penalized more for tardiness than higher wageworkers.
- Toll forecasting is difficult and does not have a good record.
- DRCOG will be changing their toll procedure, but the timeframe was unknown.
- For practicality, it is reasonable to use the DRCOG toll set of procedures.

11) Chris described the need to estimate induced travel, and the outline of the method that he worked on with Erik Sabina.

- The Bills are somewhat skeptical of induced demand. Suppressed demand, in which a traveler may forgo travel because of congestion, may occur in some circumstances.
- In general, tour based and activity based models will handle the induced demand issue much better than the traditional 4-step models.
- Models need to respond to the investment – the model needs to simulate overall demand for the facility.

12) Recently, DRCOG has recalibrated their mode choice model using the newest version of the TransCAD software package, version 4.7. The NFR's travel model has been implemented using version 4.5. Since only one version of the software can be used for the combined regional model, the Bills recommended using version 4.7 for several reasons. First, version 4.7 has a superior transit pathbuilder compared with version 4.5. Second, since we are using DRCOG's mode choice model implemented in version 4.7, it does not make sense to use the earlier version. Using the newer version, however, will require the project to team to recalibrate/revalidate the NFR model which is certainly easier than recalibrating DRCOG's model in version 4.5.

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# SIGN IN SHEET

***Travel Forecast Working Group Meeting***
***June 17, 2004, 9:00 a.m., Carter & Burgess Offices***

## *SIGN-IN SHEET*

| Name | Agency | E-Mail Address |
|---|---|---|
| Chris Primus | C+B | primuscj@c-b.com |
| Jennifer Heister | C+B | heisterj@c-b.com |
| Greg Erhardt | DRCOG | gerhardt@drcog.org |
| Andres Gomez | NFR MPO | agomez@nfrmpo.org |
| David Martinez | CDOT Region 4 | David.M.Martinez@dot.state.co.us. |
| David Krutsinger | RTD | david.krutsinger@rtd-denver.com |
| Bob Garcia | CDOT | robert.garcia@dot.state.co.us. |
| JUAN ROBLES | CDOT - DTD | juan.robles@dot.state.co.us |
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# SIGN IN SHEET

***Travel Forecast Working Group Meeting***
***June 17, 2004, 9:00 a.m., Carter & Burgess Offices***

## *SIGN-IN SHEET (Continued)*

| Name | Agency | E-Mail Address |
|---|---|---|
| Smith Myung | Manuel Padron & Assoc | smyung @mpamundo.com |
| Darcie White | clarian | dwhite@clarianassociates.com |
| Stan Elmquist | CDOT R4 | stanley.elmquist@dot.state.co.us |
| Mark Jackson | City Fort Collins Tr. Planning | mjackson@fcgov.com |
| ELLIOT SULSKY | FELSBURG HOLT + ULLEVIG | elliot.sulsky@fhueng.com |
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**North I-25 EIS Project Office**
2207 East Highway 402
Loveland, Colorado 80537
(970) 352.5455
(303) 779.3384
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## Travel Forecast Working Group Meeting
## June 17, 2004
## 9:00 am
## Carter & Burgess Office

# AGENDA

1. Trip Table Progress Update
2. CTPP Data
3. Survey Questions
4. MPO External Station Forecasts
5. Procedure for Mode Choice
6. Procedure for Traffic Assignment
7. No-Action Network
8. Other

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# MEETING MINUTES

## TRAVEL FORECAST WORKING GROUP #3

| | |
|---|---|
| MEETING DATE: | June 17, 2004 |
| LOCATION: | Carter & Burgess |
| ATTENDEES: | See sign-in sheet (attached) |
| PREPARER: | Carter Burgess<br>Jennifer Heisler |
| COPIES: | Attendees, Becky Noe, C&B File #071609.400 |

## MEETING SUMMARY

1. Chris Primus welcomed everyone and led introductions.
2. Chris reported that roadway networks for two MPO models were successfully merged. Zone systems were also successfully merged. Total of 3,479 zones.
3. Chris handed out meeting minutes for the meeting held June 9, 2004 with forecasting experts.
4. Trip Table Progress Update:
   - Original method – used I/E trips from both models and matched them. Conducted QA/QC process, which involved aggregating zones into RSAs, and comparing bi-regional trips to DRCOG roadway survey data.
     - ✓ Distributions did not compare well for roadside survey.
   - Compared RSA trip table to 2000 CTPP Census data.
     - ✓ Distribution did not compare well with Census data.
   - Also compared total number of bi-regional trips (model, roadside survey and JTW census data)
     - ✓ JTW had higher number of work trips (person trips).
     - ✓ Aggregated Census tract data into county data and checked.
   - Suggestions: check HBW ratio to number of workers.
   - Experts: defensibility of model important – suggested using Census data for work trips, and roadside survey for non-work trips.
   - Census data: summary graphic handed out which showed work locations of north study area residents – 12 % of north area residents work in Denver.

- Dave Martinez suggested that we prepare information on residents from individual cities who work in Denver metropolitan area.
- Suggestion: examine work at home data from Census.

5. Supplemental HH survey – supplemental (NFR survey done in 2001)

- Weld County area – small gap in area covered by surveys.
- Will use some of the questions that NFR HH survey used for consistency.
- Chris requested that TFWG submit questions for inclusion. Ideas included:
  - ✓ Frequency of trips to Denver CBD, DIA weekly, monthly?
  - ✓ Day of week, time of day?
  - ✓ Which route (road) do you use?
  - ✓ Include schools – i.e., UCD, DU, Metro

6. MPO External Station Forecasts

- Chris presented a comparison of MPO forecasts at external stations. Handout summarized volumes and percent differences.
- Chris requested assistance from MPOs to match the two sets of volumes.
  - ✓ MPOs generally use count data and growth factors and "reasonableness" checks.
- Suggestions: use average of two MPO growth rates or higher rates?
- Question: do volumes on roadways reflect latest development plans from communities? Answer: Not sure. Most of the communities' plans are for "build-out" scenarios, not a 20-year horizon.
- Concern: (Bob Garcia) – predictions of volumes will be achieved in much shorter time frame than are contained in EIS.
- Suggestion: how do annual growth rates in area for housing, employment compare to annual growth rates in traffic? (Daryl will check and provide to Chris.)
- Model expert suggestion: as area near two models borders develop, will see an increase in shorter trips between two areas, therefore, may want to account for growth. Experts proposed the following methodology:
  - ✓ Use a fratar process to "grow" the base year (2000/2001) combined trip table to the year 2030.
  - ✓ The row and column marginals are the sum of the:
    - 2030 unbalanced Productions (rows) & Attractions (columns) trip totals from each respective model (These production and attraction estimates are internal estimates only).
    - The average external growth rates of the two models at the three common external stations (I-25, US-287, and US-85) applied to the bi-regional trips (those trips that cross between the two MPO areas) by zone (These growth rates would be used to increase the un-normalized productions and attractions to represent total values – internal and external).

- As an example of what I recall we discussed: Zone A has internal 100 productions and has 10 internal/external productions in 2000/2001. In 2030, the number of internal productions increase to 150. Based upon the projected growth in the nearest external station (say 30%), then the number of internal/external productions would increase to 13. Therefore the total number of productions for the 2030 matrix balancing would be 163.

✓ Apply the fratar process (for each individual purpose).
✓ Replace the internal MPO portions of the balanced, combined trip table with the originals from the two models. (Important to compare the fratar output internal distribution with the internal distributions before replacement. This may lead to a revision/adjustment to the procedure).
✓ Check the resulting future bi-regional trip total to make sure that a growth rate is produced that is close (and probably slightly higher) than the MPO external station growth rates.

- Comments: (Juan Robles) – would be surprised if process increases trips in this area, but we should try it as it is not difficult and present results to group.

7. Mode Choice

- Chris presented recommendation to use DRCOG model choice model because it is calibrated for key destination, meets FTA standards, and rail ridership is available for validation purposes.
- Discussion of challenges to DRCOG model – i.e., FTA will not accept constants/ coefficients in mode split model. DRCOG is using Bill Woodford (at FTA's suggestion) to refine the model. In interim, DRCOG has developed a "quick fix" model that can be used now until model is refined and revalidated.
- Options for this project: use DRCOG "quick fix" or GIS based "sketch model" for preliminary alternatives screening.
  ✓ Value in being consistent with other corridor EISs? Yes, but this study area and characteristics are unique.
  ✓ "Quick fix" model is showing reasonable forecasts for 2030 even though 2001 validation for SW LRT corridor are low. (Model predicts 20K; actual boardings on SW LRT are 35K).
  ✓ Anticipate revised DRCOG model will be available by fall.
- Consensus was to use "quick fix" for now – need to examine how well it predicts local transit trips in Fort Collins and Greeley.

8. Traffic Assignment

- Chris presented recommendation to use DRCOG traffic assignment. Primary reason was the inability of NFR model to properly assign trips under the higher levels of congestion in Denver area. Assignment routine also accommodates toll way forecasting.
  ✓ Traffic assignment cannot be partitioned by zones.
- Consensus: Use DRCOG traffic assignment but validate results in NFR area (volumes on roadways).

9. Definition of No-Action network is underway by project team.

- Issues: What defines "committed?"
- FHWA: stance is No-Action is existing plus what is committed in TIP.
- Concerns: roadway improvements will probably be made beyond TIP in 20 years. Concern about consistency among all EISs in area.

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## Travel Forecast Strategy Meeting
## July 21, 2004
## 9:30 am
## Carter & Burgess Office

# AGENDA

1. Model Development Schedule
2. Model Development Status
3. CTPP and Roadside Data Reconciliation
4. Model Combination Approach
   - DRCOG Improvement Schedule
5. Travel Picture
6. Next TFWG Meeting
   - Schedule
   - Agenda

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# SIGN IN SHEET

***Travel Forecast Working Group Meeting***
***August 31, 2004, 1:30 p.m., Carter & Burgess Offices***

## *SIGN-IN SHEET*

| Name | Agency | E-Mail Address |
|---|---|---|
| Chris Primus | CTB | |
| Elliot Sulsky | FHU | elliot.sulsky@fhueng.com |
| Darcie White | Jarian | dwhite@jarianassociates.com |
| John Gless | GeoPraxis | gless@cybersafe.net |
| Stan Elmquist | CDOT | stanley.elmquist@dot.state.co.us |
| Smith Myung | Manuel Padron & Assoc | smyung@mpamundo.com |
| Andy Gomez | NFR MPO | agomez@nfrmpo.org |
| Dan Roebuck | CDOT DTD | jroebles@dot.state.co.us |
| Aroullakirchhaff | NFR MPO | akirchhoff@nfrmpo.org |
| Julie Morrison | C+B | jmorrison@c-b.com |
| TOM ANZIA | FHU | TOM.ANZIA@FHUENG.COM |
| Jennifer Hebler | C+B | heislerj@c-b.com |
| David Krutsinger | RTD | david.krutsinger@rtd-denver.com |

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***Travel Forecast Working Group Meeting***
***August 31, 2004, 1:30 p.m., Carter & Burgess Offices***

## *SIGN-IN SHEET (Continued)*

| Name | Agency | E-Mail Address |
|---|---|---|
| Erik Sabina | DRCOG | esabina@drcog.org |
| Debbie Wearer | FHU | debbie.wearer@fhueng.com |
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## Travel Forecast Working Group Meeting
## August 31, 2004
## 1:30 pm
## Carter & Burgess Office

# AGENDA

1. CTPP Data Processing
2. Travel Model Development Status
3. Review of Presentation Material
   - Land Use
   - Travel Characteristics
4. No-Action Network
5. Survey
6. Other

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# MEETING MINUTES

## Travel Forecast Working Group #4

| | |
|---|---|
| MEETING DATE: | August 31, 2004 |
| LOCATION: | Carter & Burgess |
| ATTENDEES: | See sign-in sheet (attached) |
| PREPARER: | Carter Burgess<br>Jennifer Heisler |
| COPIES: | Attendees, Bob Garcia, Carol Parr, Pete Graham, Dave Martinez, Becky Noe, C&B File #071609.400 |

## MEETING SUMMARY

1. Opening remarks, Tom Anzia, PM. Tom indicated he was satisfied with progress made on travel modeling to date.
2. Chris Primus provided an update on the model development: Reconciliation of CTPP data processing and roadside survey data – data for CTPP and roadside survey did not match well.
    - ✓ Fundamental difference in the way data is collected (households vs. vehicles on one day).
    - ✓ Different questions asked.
    - ✓ Not uncommon to obtain different information in different surveys.
    - ✓ "Experts" recommended that CTPP be used for geographic distribution and roadside survey for control totals.
    - ✓ HBW make up 18% to 20% of all work trips in each region; using CTPP trips results in 45% to 50% of total trips being HBW. (Roadside survey resulted in 33% person trips being HBW trips on I-25.)
3. Status of combined model components
    - ✓ Zone system – complete.
    - ✓ Combined highway network – complete.
    - ✓ Combined transit network – Fort Collins, Greeley and Loveland transit networks have been coded and incorporated into model.
    - ✓ HBW trips – have allocated RSA and TAZs based on households for productions and employment for attractions.
    - ✓ HBO and NHB trips – allocated based on DRCOG roadside survey; RSA to TAZ based on MPO model numbers.
    - ✓ Truck trips – based on DRCOG roadside survey. RSA to TAZ allocation based on weighted DRCOG trip generation rates for trucks.
    - ✓ All trip tables will be finalized within a week.

- ✓ Combined scripts – both models have been run individually through trip distribution. Script for combining trip tables is almost complete.
- ✓ Test runs – next TFWG will review results of combined models. Anticipate next meeting will be end of September. Will also discuss validation. Ideas for validation:
  - Volumes
  - Transit ridership
  - park-n-Rides?
  - Geographic market segmentation or inter-regional trips?
- ✓ Should MPOs formally send letter accepting model results? Need to determine what level of acceptance is needed.
- ✓ Stan: believes AQ conformity is most critical for project implementation (project level conformity).
- ✓ Question: How to use model for AQ conformity?
- ✓ Inter-regional trips – constant for transit trips?

4. No-Action Network: existing plus committed (funded) projects.
   - ✓ Chris handed out description and map.
5. Supplemental Survey: RFP will be issued for HH survey to gain better understanding of inter-regional travel characteristics.
6. Idea: license plate survey at parking lots at Rockies, Broncos, or other events? (i.e., DCPA)
7. Darcie and John Gless presented sample land use graphics for upcoming committees and public meetings.
8. Chris Primus reviewed travel behavior graphics.
   - ✓ Group made comments on graphics and suggested changes.
   - ✓ C&B will update graphics and PMT will review.
   - ✓ C&B will send out PDFs of graphics to TFWG for review.

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## Travel Forecast Strategy Meeting
## September 24, 2004
## 3:00 pm
## Carter & Burgess Office

# AGENDA

1. Project Schedule
2. Model Development Status
3. Next TFWG Meeting
   - Schedule
   - Experts and Locals
   - Pre-Meeting Data Distribution
4. Validation Plan
5. 2030 Data Status
6. 2030 Network FasTracks Build/No-build
7. DRCOG "Permanent Fix" Model
8. Documentation

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# SIGN-IN SHEET

***TFWG***

## *Travel Forecast Working Group*
## *November 9, 2004 – 1:00 p.m.*
## *Carter & Burgess*

| Name | Agency | E-Mail Address |
|---|---|---|
| Smith Myung | MPA | smyung@mpamundo.com |
| Jennifer Heisler | C+B | |
| TOM ANZIA | FHU | TOM.ANZIA@FHUENG.COM |
| Debbie Weaver | FHU | debbie.weaver@fhueng.com |
| Darcie White | Clarion Assoc | dwhite@clarionassociates.com |
| David Krutsinger | RTD | david.krutsinger@rtd-denver.com |
| JUAN ROBLES | CDOT | juan.robles@dot.state.co.us |
| Bill Woodford | AECOM Consult | William.woodford@aecomconsult.com |
| Chris Bimus | C+B | |
| | | |
| | | |

# SIGN-IN SHEET (cont'd.)

## Travel Forecast Working Group
## November 9, 2004 – 1:00 p.m.
## Carter & Burgess

| Name | Agency | E-Mail Address |
|---|---|---|
| David Martinez | CDOT – Region 4 | David.M.Martinez@dot.state.co.us |
| Ian Chase | Carter Burgess | chaseig@c-b.com |
| Brian Hoeschen | Carter Burgess | hoeschenbd@c-b.com |
| Andres Gomez | NFR MPO | agomez@nfrmpo.org |
| John Daggett | NFR MPO | jdaggett@nfrmpo.org |
| Mark Jackson | City Fort Collins | mjackson@fcgov.com |
| BILL DAVIDSON | PARSONS BRINCKERHOFF | DAVIDSON@PBWORLD.COM |
| Jeff May | DRCOG | jmay@drcog.org |
| Greg Erhardt | DRCOG | g @drcog.org |
| | | |
| | | |

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# AGENDA

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## Travel Forecast Working Group
November 9, 2004
1:00 p.m.
Carter & Burgess Offices

- Welcome and Introductions
- Purpose of Meeting
- North I-25 Project Status
- MPO Concurrence
- Model Overview
- Trip Table Review
- Model Results/Validation
  - ✓ Highway Results
  - ✓ Transit Results
    - Review of Rail Coding Procedure
- Status of DRCOG Model Improvements
- 2030 Forecasts
  - ✓ Status of 2030 Socio-economic Data Set
  - ✓ 2030 Trip Table
  - ✓ No-Action Network
- Summary of Meeting

# SIGN IN SHEET

*<name of Meeting>*
*<Meeting Date>*
*2 of 2*

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# MEETING MINUTES

## Travel Forecast Working Group #5

| | |
|---|---|
| MEETING DATE: | November 9, 2004 |
| LOCATION: | Carter & Burgess |
| ATTENDEES: | See attached Sign-In Sheet |
| PREPARER: | Carter Burgess<br>Jennifer Heisler |
| COPIES: | Bob Garcia, Stanley Elmquist, Carol Parr, Pete Graham, Dave Martinez, Becky Noe, C&B File #071609.400 |

## MEETING SUMMARY

1. Chris Primus opened the meeting and everyone introduced himself or herself.
2. The purpose of the meeting was to review the status of combining two MPO models, and preliminary results of model results/validation.
3. Chris Primus indicated that we would be asking for concurrence from MPOs on using combined models for project. We will likely send a letter to the MPOs.
4. North I-25 Project Status – Chris Primus presented an overview of Level 2A Alternatives that are still on the table for the project. Tom Anzia handed out a screening schedule for the alternatives, which included a master list of meetings for the next six months. The project team would like to see a 2030 No-Action model run as soon as possible.
5. Chris Primus presented an overview of the combined model. This included a review of the process, geographic area, and steps to complete a model run. Chris handed out a Model Development Notebook which contained documentation and graphics for the process. Graphics and write-ups in the notebook were used throughout the meeting to discuss the combined model results.
6. Chris reviewed the process for developing the combined model trip table. Brian Hoeschen presented an overview of the trip table processing that was conducted to develop the bi-regional trip table (by purpose) and how these trips were distributed.
7. Model Validation – Trip Tables. Brian Hoeschen described the validation process for reviewing the trip tables developed for the combined model.
8. Chris Primus reviewed the model validation results including trips by purpose and by mode. The numbers of trips for the combined models compared well to the individual MPO models.
9. Ian Chase presented a comparison of VMT and VHT for the MPO and combined models.

10. Chris Primus presented a comparison of model volumes compared to traffic counts for each of the MPO models, and a comparison of the combined model compared to both observed counts and individual model forecasts. The conclusion was that both the individual MPO models and the combined model had acceptable PRMSE of less than 40%.
    - Chris compared both individual roadway volumes at the MPO border and the overall screenline volume. The volumes compared well at the screenline level, but improvements were needed for allocation of traffic among the three facilities (US 287, I-25 and US 85). Additional refinements and checks will be made to tighten these differences. Suggestions included examination of productions/attractions in the RSA in the overlap zone, examination of impedances, and potential network issues in the Greeley area.
11. Smith Myung presented a comparison of the mode choice results for the combined models. The DRCOG mode choice model appeared to work well, although it over-predicted transit trips slightly in NFR area. It was anticipated that removal of the mode choice CBD flag would bring estimates closer.
12. Next Steps – areas for model improvements include:
    - Highway trips at border area
    - Removal of "CBD flag" in Fort Collins, Loveland and Greeley for mode choice model.
13. Comments: DRCOG
    - Jeff May – DRCOG Transportation Committee would like to add $2M to the study to enhance results. Discussion was to use this study to examine the North Metro corridor as part of FasTracks. If this is the case, DRCOG would like to make sure that the model procedures are consistent. How these two corridors are examined is yet to be determined.
    - DRCOG has two versions of models – quick fix and conformity models (slow fix). Greg Erhardt, DRCOG, presented a handout (attached) that summarized the efforts and results of the model update process. Future plans include minor refinements.
    - NFR would like to see ridership results for a transit line using the combined model.
    - RTD would like the project to use the "slow fix" version.
14. Recommendations
    - Parallel efforts to improve existing "quick fix" model and incorporate the "slow fix" version for Level 2A screening. This will probably slow down the screening process, as the "slow fix" version will take time to get running and validated. The group needs to reconvene after additional model development efforts. Also strongly recommend that we test a generic transit alternative to make sure that the model is performing well for estimating long transit trips.
15. Status of 2030 Bi-Regional Trip Table Development – Smith Myung presented an overview of how the table would be developed.
    - Chris Primus indicated the NFR (2010) and DRCOG (2030) networks have been merged. Refinements will be made as necessary to the networks so they both represent existing and programmed projects.

*TFWG #5*
*November 9, 2004*
*3 of 3*

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# SIGN IN SHEET

*TFWG#6*

## *Travel Forecast Working Group #6*
## *January 20, 2005, 9:00 a.m.*
## *Carter & Burgess*

| Name | Agency | E-Mail Address |
|---|---|---|
| Jennifer Heisler | C+B | heisterjj@c-b.com |
| Debbie Weaver | FHU | debbie.weaver@fhueng.com |
| JUAN ROBLES | CDOT – DTD | juan.robles@dot.state.co.us |
| MARK JACKSON | City Fort Collins | mjackson@fcgov.com |
| Kurt Ravenschlag | City Fort Collins | K:Ravenschlag@fcgov.com |
| Ian Chase | C & B | chaseig@c-b.com |
| David Krutsinger | RTD | david.krutsinger@rtd-denver.com |
| Bill Woodford | AECOM Consult | william.woodford@aecomconsult.com |
| TOM ANZIA | FHU | TOM.ANZIA@FHUENG.COM |
| DAVE MARTINEZ | CDOT Region 4 | David.M.Martinez@dot.state.co.us |

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*TFWG#6*

## *Travel Forecast Working Group #6*
## *January 20, 2005, 9:00 a.m.*
## *Carter & Burgess*

| Name | Agency | E-Mail Address |
|---|---|---|
| Elliot Sulsky | FHU | elliot-sulsky@fhueng.com |
| Darcie White | Clarion | dwhite@clarionassociates.com |
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# AGENDA

## Travel Forecast Working Group
## January 20, 2005
## 9:00 a.m.
## Carter & Burgess Offices

- Welcome and Introductions
- North I-25 Project Status
- Purpose of Meeting
- MPO Concurrence Procedure
- Items to Investigate/Implement
  - ✓ DRCOG New Compass Version
  - ✓ Transit Forecasting
  - ✓ Highway Allocation
- Model Results/Validation
- Transit Forecasting
- 2030
  - ✓ 2030 Trip Table
  - ✓ No-Action Alternative
- Speed Balancing
- BRT Modeling
- Documentation
- Other
- Next Meeting

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# MEETING MINUTES

## Travel Forecast Working Group #6

| | |
|---|---|
| MEETING DATE: | January 20, 2005 |
| LOCATION: | Carter & Burgess |
| ATTENDEES: | See attached Sign-In Sheet |
| PREPARER: | Carter Burgess<br>Jennifer Heisler |
| COPIES: | Bob Garcia, Stanley Elmquist, Carol Parr, Pete Graham, Dave Martinez, Becky Noe, C&B File #071609.400 |

## MEETING SUMMARY

1. Attendees were given a packet of material to update their "North I-25 EIS Model Development Notebook" which had been distributed at a prior meeting. This material was reviewed in detail throughout the meeting.
2. MPO Concurrence: Chris Primus will send the two MPOs documentation of the combined model for review.
   - NFR MPO: couldn't make meeting; Chris set-up meeting with Andy Gomez and John Daggett for January 26 to review meeting.
   - Tom Anzia suggested that Chris Primus attend meeting with Cliff Davidson, NFR MPO Director, on February 11, 2005 to review information.
3. Items to Investigate/Implement
   - DRCOG New Compass Version (90) Model: team obtained version of new model and applied it to combined model.
   - Trip Tables: Chris showed 2000/2001 TAZ level bi-regional trip table results for combined model for origins in NFR and DRCOG model areas respectively.
   - Highway Allocation: An earlier version of the combined model did not properly allocate trips between the highways of US-287, I-25, and US-85, in the vicinity of the merge area between the two MPO regions. To address this issue, the team added in NFR turn penalties, changed some functional classifications through small towns, revisited centroid connectors at "edge" zones, and enhanced network at "edge" zones. The result is the trips are now assigned properly to the roadways (I-25, US-287, US-85).
4. Model Results/Validation
   - Trip Generation/Trip Distribution matched when two models were combined.

- Mode Split: the number of trips in the combined model with the bi-regional trips matched well to the independent MPO models.
- VMT/VHT:
  - ✓ VMT: combined model slightly lower than two individual models (because of model overlap).
  - ✓ VHT: combined model about the same as two individual models.
- Highway Assignment:
  - ✓ Model volumes compared to traffic counts by facility type and screenline, within 3%.
  - ✓ Compared combined model volumes to each individual model:
    - NFR: results were better than previous version
    - DRCOG: results were better than previous version
  - ✓ Compared combined model volumes to traffic counts:
    - NFR – within 1.2%
    - DRCOG – within 1.5%
  - ✓ Daily Volumes at MPO Border
    - I-25: very good match
    - US 85: a little high compared to individual models
    - US 287: a little high compared to individual models
    - Overall screenline very good
    - I-25 in NFR area – combined model replicates NFR model well
- Mode Choice:
  - ✓ Mode share of combined model compared well to DRCOG model
  - ✓ Compared NFR area to combined model – transit trips for combined model = 8,200 trips, 1998 FC model = 6,300 trips
- Transit Boardings (Assignment)
  - ✓ Combined model compared to NFR ridership compared remarkably well given small number of routes and limited ridership data.
  - ✓ Compared combined model results to DRCOG model for RTD routes – very good comparison.
  - ✓ Test case – combined model using a generic "practice" transit line along I-25 (70 mph speed, 15/30 hdways) resulted in bi-regional trips using transit.
  - ✓ Analyzed transit mode share in Denver region for long trips to determine if combined model could accurately predict these trips. Analysis showed combined model predicted 20% to 40% transit use in other long-distance corridors throughout the RTD region served by Regional bus service. For the

"practice" transit run, the combined model showed 45% use of transit to Denver CBD. In conclusion, it was agreed the combined model performed well.

5. 2030

- 2030 Trip Table (bi-regional): challenge is to grow trips in areas where no trips exist today. Proposed approach was to use "fratar" growth factor process to account for land use changes (development filling in between regions).
  - ✓ Fratar process: initial attempts did not work as expected; expected bi-regional trips to approximately double, did not occur consistently.
  - ✓ Developed new method based on discussions with modeling experts. Proposed approach will hold to speed balancing of each MPO and to anticipated growth in external trips forecast by each MPO. An initial test of this approach proved successful.

6. Speed Balancing: plan to input both MPO's speed balancing process independently and then use those speeds to run combined model.

7. BRT Modeling

- Issue: no standard procedure exists today to model BRT as separate mode. DRCOG has procedures for service types for transit.
- Proposed approach is to code it as rail, but put in travel times of buses.
  - ✓ DRCOG would like to see sensitivity analysis of treating BRT as regional bus to see what differences in forecasts would be. Would also like the North I-25 project team to coordinate with US 36 corridor regarding their process for modeling BRT.
  - ✓ Bill Woodford suggested that FTA coordination is critical, as rules are changing frequently.

8. Documentation

- Model notebook will constitute documentation; Chris Primus will coordinate with each MPO

9. Next meeting

- Purpose will be to review results of 2B screening

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***TFWG#7***

## *Travel Forecast Working Group #7*
## *May 12, 2005, 1:30 p.m.*
## *Carter & Burgess*

| Name | Agency | E-Mail Address |
|---|---|---|
| Chris Primus | Carter + Burgess | chris.primus@c-b.com |
| Smith Myung | Connetics Transportation Group Manuel Padron & Associates | smyung@mpamundo.com |
| Debbie Wearer | FHU | debbie.wearer@fhueng.com |
| Holly Miller | Felsburg Holt & Ullevig | |
| David Krutsinger | RTD | david.krutsinger@rtd-denver.com |
| Todd Frisbie | Felsburg Holt & Ullevig | |
| Stan Elmquist | CDOT R4 | stanley.elmquist@dot.state.co.us |
| Jennifer Heisler | C+B | Jennifer.heisler@c-b.com |
| Greg Erhardt | DRCOG | gerhardt@drcog.org |
| Darcie White | Clarian | dwhite@clarianassociates.com |
| JUAN ROBLES | CDOT - DTD | juan.robles@dot.state.co |

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*TFWG#6*

## *Travel Forecast Working Group #7*
## *May 12, 2005, 1:30 p.m.*
## *Carter & Burgess*

| Name | Agency | E-Mail Address |
|---|---|---|
| DAVE MARTINEZ | CDOT | David.M.Martinez@dot.state.co.us. |
| STEVE OLSON | CDOT | Michael.Olson@dot.state.co.us |
| Kurt Ravenschlag | Fort Collins | Kravenschlag@fcGov.com |
| John Daggett | NFRMPO | jdaggett@nfrmpo.org |
| Ramesh Thammiraju | C&B | thammirajurk@c-b.com |
| Andres Gomez | NFRMPO | agomez@nfrmpo.org |
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# AGENDA

## Travel Forecast Working Group #7
## May 12, 2005
## 1:30 p.m.
## Carter & Burgess Offices

- Welcome and Introductions
- Model Development Status
  - ✓ Transit Forecasting
  - ✓ 2030 Trip Table
  - ✓ Tollway Model
- North I-25 Project Status
- 2030 Model Application
  - ✓ Highway Alternatives & Results
  - ✓ Transit Alternatives & Results
- Review of Transit Results Presentation
- Documentation
- Other
- Next Meeting

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# MEETING MINUTES

## TRAVEL FORECAST WORKING GROUP #7

| | |
|---|---|
| **MEETING DATE:** | May 12, 2005 |
| **LOCATION:** | Carter & Burgess, Mt. Evans A & B |
| **ATTENDEES:** | See sign-in sheet (attached) |
| **PREPARER:** | Carter Burgess<br>Chris Primus |
| **COPIES:** | Attendees, Becky Noe, C&B File #071609.400 |

## MEETING SUMMARY

1. Welcome and introductions: Dave Martinez introduced Steve Olson as the new CDOT, Region 4 project team member.

2. 2030 Model Results:

   Chris reviewed the results of the 2030 combined model results for:
   - Total number of trips
   - Mode split
   - VMT
   - VHT
   - Average speeds

   He concluded that the 2030 results had similar patterns as the 2001 calibration, and that the combined model was working well.

3. 2030 Bi-Regional Trip Table:

   Smith Myung presented the process and results of developing the 2030 bi-regional trip table (method summary and flow chart attached). The results met the 10 percent criterion for convergence.
   - Juan Robles recommended spot checks of zero trip zones.

4. Tolls:

   Chris Primus discussed the toll model. Initial model runs of a toll alternative showed that the peak toll model did not appear correct. Greg Erhardt (DRCOG) indicated that DRCOG has looked into the toll model and found that the peak

model was working, but the off-peak was not producing the right results. DRCOG has been working to balance the value of time, distance and toll elements in the model to produce the correct results (using existing toll road volumes). DRCOG indicated they were applying these adjustments to the 2030 model and a new version should be available in the next two weeks.

5. North I-25 Project Status:
   - Level 1 screening complete: (fatal flaw)
   - Level 2a screening complete: (reduce number of alternatives)
   - Level 2b screening underway: examining highway and transit alternatives further to screen for more detailed evaluation in Level 3.
   - Level3 screening: will commence this summer

6. Highway Alternatives and Results:

   Holly Miller presented the results for the highway alternatives, alternatives included:
   - No-Action
   - HOV lanes to State Highway 14
   - Limited Access Lanes (2 lanes in each direction, US 36 to SH 1, with fewer access points)
   - 6 Lanes (not modeled, interpolated)
   - 8 Lanes

   Screening results: Used travel time to measure and percentage of congested lane miles as mobility measure; recommended carrying forward:
   - No Action
   - HOV Lanes
   - Toll Lanes
   - HOT Lanes
   - Limited Access Lanes
   - 6 GP Lanes
   - 8 GP Lanes

7. Transit Alternatives and Results:

   Chris Primus presented results:
   - Overall ridership by alternative
   - Overall ridership by alternative and for feeder routes

- Station to station volumes
- Station boardings and alightings

**Comments:** Stan Elmquist recommended that scales on all graphs be similar. Chris Primus indicated that modeling experts suggested a reasonableness test of 30% plus capture of transit trips to the Denver CBD; 2030 model is meeting this criteria (all alternatives capture 32% plus for total trips and 45% plus for work trips).

**Question:** How do transit travel times compare to highway? Chris Primus presented a slide showing that transit travel times compared well.

**Comments:** Need to modify travel times for BRT-A on slide because alternative only goes to US 36; suggest adding stacked bar to show additional times on US 36 to I-25 to DUS.

Investigate why there is such a big difference in travel times between Commuter Rail D and Commuter Rail E.

Consider using common origin and destination points for travel time comparisons, show this by using stacked bars.

Interesting that there is not such a large difference in overall ridership between alignments.

8. Transit Results Presentation:

Chris Primus presented a draft presentation of the transit results for comments by the TFWG

**Comments:** Foxtrot ridership is high – why?

- Coded as local route with stops at major intersections, and local fares

  Ridership still seems high – mostly businesses along US 287

- We will take a look at proposed land use along US 287 in 2030, and look at ridership in more detail.

- Show O/D for 2030 by plotting out bi-regional trip table as DOT density maps as reference.

  Peer System Review: Add in hours of service for peer systems, put in peak and off-peak ridership and comparative population and employment data. Also obtain peak ridership for North I-25 alternatives.

  Prepare a map delineating "capture areas" for each of the stations – will indicate where people are coming from that get on at each station.

  Note: TAFS Study did not assume FasTracks – a lot of ridership for TAFs could have come from Boulder/Longmont/SW Weld County.

- Switch station activity boardings legend to highways, not city names.

- Look at drive versus walk access along transit lines.

- Consider testing impact of higher cost of fuel on transit? Recommend that we double operating costs as sensitivity test.

9. <u>TFWG Comments:</u>

   - Overall results are very reasonable.
     - ❖ Especially given land use assumptions (suburban) – 2030.
   - Somewhat surprised at minimal differences between alignments.
   - 4 to 5K daily riders is comparable to RTD's Long Regional Routes today.

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# SIGN IN SHEET

## Travel Forecast Combined Model Review Meeting

**June 30th, 3:30 p.m.**

**Carter & Burgess, Inc. – downtown Denver**

| Name | Agency | E-Mail Address |
|---|---|---|
| Lee Cryer | RTD | lee.cryer@rtd-fastracks.com |
| Erik Sabina | DRCOG | esabina@drcog.org |
| ELLIOT SULSKY | FHU | elliot.sulsky@fhueng.com |
| Smith Myung | CTG | smyung@connecticsgroup.com |
| Chris Flinn | CB | |
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# AGENDA

## Travel Forecast Combined Model Review Meeting

June 30, 2006 at 3:30 PM
Carter & Burgess, Inc. – Downtown Denver

1. EIS Schedule
2. Review of Combined Model
3. Update Process
4. Review of Validation Statistics
5. 2030
6. 2015
7. Full TFWG Agenda Topics & Meeting Date
8. Other

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# TRAVEL FORECAST Combined Model Review

**MEETING DATE:** June 30, 2006

**LOCATION:** Carter & Burgess, Mt. Evans A

**ATTENDEES:** See sign-in sheet (attached)

**PREPARER:** Carter Burgess
Chris Primus

**COPIES:** Attendees, C&B File #071609.400, Gayl Harrison

## MEETING SUMMARY

1. Chris described the schedule for the production of the DEIS, and specifically that the modeling is on the critical path at the beginning of the process. He handed out graphics depicting the DEIS alternatives.

2. As a reminder, Chris reviewed the basic structure of the combined model.

3. Chris briefly described the process of updating the combined model to incorporate DRCOG's and RTD's latest changes to the networks and resource code. Besides the new parameters and routines incorporated into the model, there had also been many roadway and transit network changes since the combined model had been originally established in late 2004 / early 2005.

4. The sets of validation statistics of the combined model were reviewed for the bi-regional trip tables, trip generation, trip distribution, mode choice, VMT, I-25 volumes, and transit ridership.

    - Chris stated these compared very similarly to the validation statistics produced when the combined model was first developed. It was agreed that the statistics looked reasonable, except there was concern on the I-25 model volumes compared to traffic counts. The model projections are high compared to the traffic counts on many segments. This is also true of the NFRMPO model, and the combined model is slightly higher than the NFRMPO model.

    - Chris first explained that the I-25 counts were obtained by the project in August of 2004, and factored for year and season to 2000 AWDT. An annual growth rate of 1.9% was obtained by averaging the three ATR counts in this area, and it was agreed the growth rate seemed reasonable. The season adjustment of 0.94 was also obtained from ATR data. The NFRMPO model has year 2000 counts for some I-25 segments that are generally similar to the factored project counts, but there is more confidence in the project counts due to the team's familiarity.

    - It was noted the DRCOG traffic assignment has different capacities, free-flow speeds, and vdf curves than the NFRMPO model, and is probably routing more traffic to the freeway for these reasons. It was suggested that a comparison be made between the DRCOG and NFRMPO models to better understand this pattern. It was also suggested that the new combined model be compared to the old combined model, to understand how the recent model changes have affected the traffic assignment characteristics up north.

- It was also suggested that a screenline comparison be made to better understand the I-25 traffic volumes.

- Smith reported the transit assignment statistics looked good and were slightly better than the validation of the original combined model. It was agreed that the transit statistics were reasonable and the DRCOG mode choice and transit assignment routines function remarkably well in the NFR area.

5. The initial 2030 model has been run, but the team is confirming it matches a DROCG/RTD 2030 reference run within reason before proceeding with running the DEIS alternatives.

6. A 2015 model will be prepared. Chris said that Wilbur Smith and Associates is on the North I-25 team to handle toll forecasting and revenue projections. Wilbur Smith needs a 2015 for North I-25 as well as other CTE work.

7. A full meeting of the Travel Forecast Working Group (TFWG) is planned to meet sometime in August. The potential agenda topics will include

    - Update on the revisions to the combined model
    - Combined model documentation
    - Review of DEIS results
    - Results of a reallocated land use test run
    - Method for estimating carpool lot sizing
    - Toll forecasting status report
    - Special Event and Weekend travel methodology
    - Induced travel methodology
    - Ridership workshops briefing

8. Since the NFRMPO could not attend this meeting, Chris will meet with them in mid-July when the NFRMPO has availability.

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# SIGN IN SHEET

## Travel Forecast Combined Model Review Meeting
### July 13, 2006 at 10:00 a.m.
### NFRMPO Offices

| Name | Agency | E-Mail Address |
|---|---|---|
| Andres Gomez | NFRMPO | agomez@nfrmpo.org |
| STAN ELMQUIST | CDOT R4 | stanley.elmquist@dot.state.co.us |
| Smith Myung | CTG | smith.myung@connecticsgroup.com |
| CHRIS PRIMUS | CB | |
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# TRAVEL FORECAST Combined Model Review

**MEETING DATE:** July 13, 2006

**LOCATION:** NFRMPO

**ATTENDEES:** See sign-in sheet (attached)

**PREPARER:** Carter Burgess
Chris Primus

**COPIES:** Attendees, C&B File #071609.400, Gayl Harrison

## MEETING SUMMARY

1. Chris described the schedule for the production of the DEIS, and specifically that the modeling is on the critical path at the beginning of the process. He handed out graphics depicting the DEIS alternatives.

2. As a reminder, Chris reviewed the basic structure of the combined model.

3. Chris briefly described the process of updating the combined model to incorporate DRCOG's and RTD's latest changes to the networks and resource code. Besides the new parameters and routines incorporated into the model, there had also been many roadway and transit network changes since the combined model had been originally established in late 2004 / early 2005.

4. The sets of validation statistics of the combined model were reviewed for the bi-regional trip tables, trip generation, trip distribution, mode choice, VMT, I-25 volumes, and transit ridership.

    - Chris stated these compared very similarly to the validation statistics produced when the combined model was first developed. It was agreed that the statistics looked reasonable.

    - Smith reported the transit assignment statistics looked good and were slightly better than the validation of the original combined model. It was agreed that the transit statistics were acceptable and reasonable. It was noted that to improve public confidence of the results, the percent difference between estimated (modeled) transit trips and observed transit trips is negligible compared to total trips, and this could be conveyed to the public.

    - Andy stated he has route specific boarding data for all the NFR area routes.

- Chris first explained that while reviewing these same materials with DRCOG and RTD, there was concern on the I-25 model volumes compared to traffic counts. The model projections are high compared to the traffic counts on many segments. This is also true of the NFRMPO model, and the combined model is slightly higher than the NFRMPO model.

- It was noted the I-25 counts were obtained by the project in August of 2004, and factored for year and season to 2000 AWDT. An annual growth rate of 1.9% was obtained by averaging the three ATR counts in this area, and it was agreed the growth rate seemed reasonable. The NFRMPO model has year 2000 counts for some I-25 segments that are generally similar to the factored project counts, but there is more confidence in the project counts due to the team's familiarity.

- It was noted the DRCOG traffic assignment has different capacities, free-flow speeds, and vdf curves than the NFRMPO model, and is routing more traffic to the freeway for these reasons.

- A screenline comparison was made to better understand the I-25 traffic volumes.

    i. It was found that the NFR model compares well to the screenline count data

    ii. The combined model has more trips in the southern east-west screenlines than the NFR model, but this is due to the bi-regional trip table built to match the best estimate of counts at the border. It was recognized that the NFR model does not capture all of these trips because it is on its border area.

    iii. It was found the combined model places more volume on higher functional class roads than lower class roads, compared to observed field counts.

    iv. In conclusion and as expected, the model's highway volumes need to be adjusted using the NCHRP 255 procedure, and it was agreed that this was appropriate.

5. The initial 2030 model has been run, but the team is confirming it matches a DROCG/RTD 2030 reference run within reason before proceeding with running the DEIS alternatives.

6. A 2015 model will be prepared. Chris said that Wilbur Smith and Associates is on the North I-25 team to handle toll forecasting and revenue projections. Wilbur Smith needs a 2015 for North I-25 as well as other CTE work.

7. A full meeting of the Travel Forecast Working Group (TFWG) is planned to meet sometime in August. The potential agenda topics will include

    - Update on the revisions to the combined model

    - Combined model documentation

    - Review of DEIS results

    - Results of a reallocated land use test run

    - Method for estimating carpool lot sizing

    - Toll forecasting status report

- Special Event and Weekend travel methodology
- Induced travel methodology
- Ridership workshops briefing

8. Since this fall, the NFRMPO and DRCOG will have new versions of their models in TransCAD 4.8, there was some discussion on when the North I-25 team may need to update the combined model again. It was agreed that at a point in time closer to the FEIS would be appropriate to consider this decision.

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# MEETING MINUTES

## North I-25 Travel Forecast Working Group Meeting

| | |
|---|---|
| **MEETING DATE:** | February 21, 2008 |
| **LOCATION:** | Southwest Weld County Services Building |
| **ATTENDEES:** | CDOT: Carol Parr, Long Nguyen, Dave Martinez<br>NFRMPO: Arvilla Kirchhoff, Suzette Mallete<br>DRCOG: Jennifer Malm<br>RTD: Lee Cryer<br>C&B: Chris Primus, Ramesh Thammiraju<br>FHU: Elliot Sulsky |
| **PREPARER:** | Carter Burgess |
| **COPIES:** | Attendees, Gina McAfee, Gayl Harrison, Tom Anzia,<br>C&B File #071609.400 |

## MEETING SUMMARY

1. Introductions were made.

2. Chris Primus stated the purpose for the meeting is to consider and recommend the model method that should be employed to produce travel forecasts for the FEIS. It was confirmed that changing the forecasts is permissible between the DEIS and the FEIS.

3. Chris stated that the selection and development of the preferred alternative would occur during September through November of 2008, and therefore the FEIS model needed to be ready by August of 2008.

4. Chris briefly described the two alternative packages that were fully evaluated in the DEIS. He stated that the packages are composed of components, and that the preferred alternative would be formed by mixing and matching various components from the two DEIS packages. For this reason, new forecasts would be required.

5. Chris gave an overview of the travel forecast results for the DEIS packages, including an overview of highway results and transit results by package. He confirmed that the final highway results were post-model adjusted based on current traffic counts, while the transit results were direct output from the model, since regional transit services are not currently in place in the north front range.

6. Chris briefly described the model that had been developed for the DEIS. It was clarified that the model had been used for three stages of screening as well as numerous sensitivity tests.

   - No regional model was available that covered the study area, and therefore a combined model needed to be developed.
   - The combined model was to be multi-modal, handle the long trips between the NFRMPO and DRCOG regions, and be practical by using existing tools where feasible.
   - Various combined model alternatives were considered.
   - The selected approach for the combined model involved:

     i) Combining zone systems and networks

     ii) Using the existing mpo models trip generation and trip distribution

     iii) Developing bi-regional trips from original survey data from the 2000 journey-to-work data and the 1997 DRCOG roadside survey

     iv) Combining trip tables from the two models, discarding the prior model internal-external and external-external trip tables in the border region, and adding the bi-regional trip table top form combined zone system trip tables.

     v) Operating the DRCOG mode choice and assignment routines under the combined platform.

     vi) Running the combined model and confirming the highway and transit results validated the same or better than the original models compared to observed volumes for the base year of 2000/2001.

   - The combined model was developed with the 2030 RTP models of NFRMPO and DRCOG, which were in effect at that time.
   - Wilbur Smith and Associates provided toll lane traffic forecasts using travel demand input data from the combined model.

7. Suzette gave an update on the status of the NFRMPO model:

   - They have updated the model to include mode choice, as well as split zones along regionally significant corridors. It has been validated to a 2005 base year, and the horizon year is 2035.

- NFRMPO has adopted a 2035 RTP.
- A video camera license plate matching external-to external survey and a transit on-board survey had been conducted recently to support the model development.
- A household survey is planned for fall of 2008.

Jennifer and Lee gave an update of the DRCOG model:

- DRCOG has adopted a 2035 RTP, and the current structure of the TransCAD model is available for 2035.
- They are adding more zones, and hope to update the TransCAD model this spring.
- The mode choice module is being improved to a nested logit structure, partially due to recent on-board transit survey data from the southwest and southeast LRT lines. This may be ready this spring, but the eventual inclusion of it with the new zone system and use of it for the formal model of DRCOG's 2035 RTP would be a longer timeframe.

8. Chris stated that besides modeling of the FEIS preferred alternative, a model run that reflects the impact of induced growth needed to be performed as well during the FEIS. After some discussion, a range of options were identified for the FEIS model:

   - "Use Existing 2030". This would be the application of the 2030 combined model, with no changes. This would clearly be the least expensive option. However, after some discussion, it was suggested that updating to the2035 data set would be beneficial for the long term validity of the FEIS and ROD
   - "Use Existing 2030 and Document the Likely Effect of 2035". A technical memorandum would be prepared that provides a quantitative analysis of the changes between the 2030 and 2035 datasets, and the likely result on highway and transit forecasts. However, after much discussion, it was thought that given general direction from the federal agencies recently on other projects, a more direct approach would be preferable.
   - "Use Existing Model Structure But Update the Networks and Land Use Datasets to 2035". The current structure and program code of the combined model would be retained, but the networks and land use datasets from the adopted 2035 RTPs from NFRMPO and DRCOG would be used.

- "Cadillac". This would involve updating the combined model to reflect the new zone systems, improved models from the respective regions, and other improvements. After a brief discussion, it was quickly recognized that this would be by far the most expensive option. Furthermore, Chris noted that a key element of the combined model is the long bi-regional trips, which were based on origin and destination survey data from the Census and the DRCOG roadside survey. Since no new survey data is available, a major rebuilding of the combined model would not be worthwhile.

It was agreed that the option of using the current model structure but updating the networks and land use to 2035 would be recommended. The next step is to present these options and recommendation to the federal agencies.

9. After discussing the inclusion of the tri-town area into the DRCOG, Suzette confirmed that the land use data projections wouldn't likely be affected very much, since DRCOG and NFRMPO have already coordinated for many years in this area in the common border regions of their respective modeling boundaries, and will continue to do so.

10. Next steps are to place this discussion and recommendation as an agenda item for a project meeting at which representatives from both FHWA and FTA are present.

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# MEETING MINUTES

## Travel Forecast Working Group Meeting

**MEETING DATE:** November 9, 2010

**LOCATION:** Jacobs Office
Mt. Evans A & B conference rooms

**ATTENDEES:**

| | |
|---|---|
| **CDOT:** | Carol Parr, Long Nguyen, Juan Robles |
| **Clarion Associates:** | Darcie White |
| **DRCOG:** | Erik Sabina, Suzanne Childress |
| **FHWA :** | Eric Pihl |
| **FHU:** | Holly Buck, Elliot Sulsky |
| **Jacobs:** | Chris Primus, Keith Borsheim |
| **Northern Range MPO:** | Arvilla Kirchhoff |
| **RTD:** | Jeet Desai, Lee Cryer |

**PREPARER:** JACOBS

**COPIES:** Attendees, Tom Anzia, Thor Gjelsteen, Bob Quinlan, File

# MEETING SUMMARY

1. Chris Primus did the welcome, background and purpose of meeting.
   - Introductions.
   - The EIS project is in the first stages of completing the FEIS document.
   - This group's task is to identify a range of likely ridership numbers for the Preferred Alternative based on recent changes made by DRCOG to the model.
2. Project Background
   - Chris described the structure of the combined model.
   - Keith described the elements of the Preferred Alternative, transit service plan and 2035 ridership estimates made for FEIS. Service at SH 7 is very good. Frequency is at about 10 minutes during the peak.
   - RTD plans to extend 120 and 120X north to SH 7 to a new park and ride. This is in addition to the North Metro service.

- Jeet did a previous analysis that showed that the north metro rail and express bus do not compete with each other. They serve different markets.
- A previous stop was included at Wagon Road but found that this did not meet the projects purpose and need.
- FHWA asked where there is direct competition? Chris said overlapping market in south area primarily.
- SH 7 has highest activity.
- This project assumes tolled express lanes all the way. RTD's estimates do not include this project therefore ridership is not as high.

3. Updates to DRCOG/RTD Regional Model

- Jeet presented updates to the model and impacts to FasTracks lines.
- Model was recently updated from compass 3 to compass 4. This could result in 20 percent increases on rail corridor ridership. Compass 4 reflects latest work by DRCOG and new survey data.
- Jeet showed previous model results and new model results. North Metro 2035 ridership changed from 13,000 to 24, 000. Northwest went from 8,400 to 17,400 per day.
- Key factors for change include:

  i) Land Use

  ii) Model Code

  iii) Horizon Year

  iv) Highway Network

- Land use — the urban area became more dense than normal area. Urban area has more employment and households. Control total the same — less in rural area.
- Model — these changes included recalibration of VMT, trip generation rates, value of time and other key factors. Many changes were based on a recent transit on-board study conducted by RTD. This model results in higher rail ridership.
- Horizon Year and Highway Network — updated from 2030 to 2035.

- Sensitivity analysis — changed one parameter at a time to determine how much of the change is attributable to each parameter.

  i) Land use — changes resulted in 9 percent increase in transit ridership. 7 percent increase in vehicle hours of delayed and person hours of delay. Erik provided insights about changes to land use. A lot of shifts and changes to urban centers. These have been included now to reflect the communities' latest plans. Urban centers tend to be around rail lines. No increases in size of urban area. This resulted in higher density. Southwest Weld County was not previously in model. Previously, regional economists decided the allocation of growth to Southwest Weld. Now it competes with other zones in the DRCOG land use allocation model. This has resulted in somewhat less employment growth in the Southwest Weld area.

  ii) Highway Changes — 2 percent increases in freeway miles and 9 percent in toll lanes.

  iii) Compass 3 versus Compass 4 — more trips occurring in region. 9 percent increase in rail boarding's. On-board survey indicated that a higher portion of trips are not work trips but school trips, and other trips. This has resulted in less CBD activity on the Mall Shuttle.

  iv) Horizon year — increased population 9 to 11 percent. 60 percent increase in vehicle hours of delay and person hours delay. This resulted in 16 percent increase in transit trips.

- Overall story — these various factors compound changes in model results. It is important to understand models are always changing due to incorporation of new information and other improvements. But periodically the numbers need to be 'locked' in to enable planning processes to move forward.

- FHWA asked Jeet what his take was on the change in horizon year. Lane miles do not grow adequately to support growth. This results in high increases in delay and shifts to rail transit.

4. Process

- Arvilla said the new bus route between Fort Collins and Longmont has good initial ridership numbers; but she didn't know if these are mostly long trips or short trips.

- Recent NFR household survey had similar results to previous survey.

- No real comparisons have been made between NFR & DRCOG survey results. Land use policy has changed in DRCOG. Has NFR policy changed as well? No but, Arvilla will compare new land use model to previous model
- How much was walk versus drive access at US 34 and SH 257?
- DRCOG has noted that some of their northern communities have recently become more proactive in TOD at urban center planning, as opposed to the southern communities where TOD supportive policies have already been established. It is possible that the NFR area will also "catch up" in this regard.
- However, Arvilla and Darcie agreed that the land use changes would be muted in northern Colorado. They have more area to work with and are less constrained than metro area.
- Elliot suggested that this same logic could be applied to beyond the 2035 planning horizon.

5. Data needs

- Specific rail ridership increases would be useful — ask Jeet for Northwest Rail statistics.
- FTA developed ARRF — independent forecasting. Sketch model for commuter rail. Chris will check into this to see the level of effect required.
- Peer systems and their ridership characteristics. — Have these been examined? Chris said an earlier review had been conducted but it could be updated to include Commuter Rail in Salt Lake and New Mexico.
- Data from HH surveys could verify number of people traveling between northern Colorado and Denver. DRCOG will see if a simple analysis is possible.
- DRCOG also conducting supplemental long-distance travel survey, but is not yet available. Erik will look and see what might be available for next meeting.

6. Process

- Chris described the Delphi technique that could be used for this process.
- After some discussion, it was agreed a modified approach would be appropriate.
- Chris will work with consultant team to develop a range for each of the modes, for presentation and review and evaluation by the group at the next meeting.

7. Next Meeting

- Chris reminded the group that the next meeting is November 23, 2010 at 3:00.

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# MEETING MINUTES

## Travel Forecast Working Group Meeting

**MEETING DATE:** November 23, 2010

**LOCATION:** Jacobs Office
Mt. Evans B conference room

**ATTENDEES:**

| | |
|---|---|
| **Clarion Associates:** | Darcie White |
| **DRCOG:** | Suzanne Childress |
| **FHWA :** | Eric Pihl |
| **FHU:** | Elliot Sulsky |
| **FTA** | Larry Squires |
| **Jacobs:** | Chris Primus, Keith Borsheim |
| **RTD:** | Lee Cryer |

**PREPARER:** JACOBS

**COPIES:** Attendees, Tom Anzia, Thor Gjelsteen, Carol Parr, Long Nguyen, Bob Quinlan, File

## MEETING SUMMARY

1. Chris Primus did the welcome and purpose of meeting.

   - Introductions.
   - Chris reminded the group that the task at hand is to identify a range of likely ridership numbers for the Preferred Alternative based on recent changes made by DRCOG to the model. Today, based on the plan outlined at the prior meeting, an estimate will be developed.

2. New Information

   - At the prior meeting, there were some calls to gather additional information; these were presented and discussed:
   - Keith reported that RTD had supplied more detailed corridor and route sensitivity model run results, as had been requested. These will be presented during the next agenda item of this meeting.
   - Darcie reported that she had conferred with Arvilla Kirchhoff of NFRMPO. Arvilla could not make it to today's meeting. But as promised at the last meeting, Arvilla did

investigate the NFRMPO new land use model that they will be using to develop an updated 2035 socio-economic dataset. In contrast to the description of future land use patterns in the NFRMPO area suggested at the last meeting, Arvilla found that their new model allocates development more towards city centers than the current model. The rural non-platted areas are not as attractive as they had been. This is based on interviews with their member communities. This will have the overall effect of slightly denser city centers, and slightly less development near I-25, than the prior 2035 projections. This is more in-kind with the overall urbanization and densification modifications that DRCOG made to its 2035 socio-economic dataset.

- Jacobs investigated the FTA ARRF model. It is a sketch planning tool. It requires data analysis using GIS of population and employment analysis, and analysis of CTPP data. The model itself is a spreadsheet model. It was initially developed in 2006, which is after the North I-25 EIS had begun its analysis. The ARRF was updated in 2009. Application for this project at this point in time is not possible due to the project resources and schedule that are available. However, it was pointed out that it was developed for areas without a locally calibrated mode choice model that have brand new proposed commuter rail lines. A full local model, such as has been used for the North I-25 EIS, is a superior planning tool. The ARRF would have been useful at the earliest stages of this project.

- Suzanne reported that new DRCOG survey data is not ready at this time. The new roadside survey has not yet been conducted. The household survey results are still being processed to develop weighting factors and finalized analysis, and so are not ready at this time. Chris said that these data are not necessary; but it would have been nice to have a new data source of trips between the regions to supplement and confirm the survey results that were used for the North I-25 Combined model (the 1997 DRCOG roadside survey, the 2000 NFRMPO household survey, and the 2000 CTPP).

- Keith distributed a table showing peer commuter rail systems. There are many commuter rail systems across the country, but those that serve western cities are summarized for comparison to this project's commuter rail system. Jacobs and Clarion had compiled a detailed report of commuter rail systems at an earlier stage of this project. Keith updated the reported ridership numbers from APTA for the systems, and added two brand new systems. Only some summary statistics are presented today. It was noted that there are many differences between commuter rail systems, including service levels, the presence of competing bus service, build –out of the service area, extension versus complete line, and many others. However despite these dissimilarities, after review by the group, it was agreed that the general magnitude of projected ridership results for the North I-25 commuter rail line seemed to fall in the same line as the peer commuter rail systems in the western states.

3. Potential Effect on Ridership

- Keith distributed and described a worksheet that the consultant team developed for review by the working group. The sensitivity results of RTD's on these changes are provided as a reference in the worksheet. The current results by station are factored up by percentages to reflect changes to 1) land use, and 2) by station.

- It was requested that the key factors for change be described again:

  i) Land Use

  (1) The urban area became more dense than normal area. Urban area has more employment and households. Control totals the same — less in rural area.

  ii) Model Code (Compass 3 revised to Compass 4)

  (1) These changes included recalibration of VMT to 2007 traffic counts, trip generation rates, value of time, trip length adjustments, k-factors, and other factors. Many changes were based on a recent transit on-board study conducted by RTD that found more non-CBD non-work trips on transit than before.

- The group reviewed and discussed each category of percentage change, by change type, by mode, and by geographic area. The consultant team populated the worksheet with initial proposed percent increases by category. It was clarified that the percents are assumed percentages, not revealed. It was noted that these are soft averages of the information from RTD. After discussion, it was agreed that soft averages convey the imprecision of the data and process.

  i) It was suggested that a 25% increase due to the model code for commuter rail in the northern area would be more appropriate, to not exaggerate the observed effect of Northwest Rail.

  ii) The 15% percent change due to land use changes for express bus at South Transit Center were discussed at length; but agreement came to that 15% is appropriate.

  iii) It was suggested that the average effect on the Regional transit mode observed in the RTD sensitivity model runs would be more appropriate than the regional transit averages, which were suggested as defaults. Lee said this would be easy to obtain and would send to be used.

  iv) The suggested percent change for other categories were reviewed and accepted.

- Chris said that this process and result would be documented in a white paper, which would become an appendix to a technical report in the FEIS. A short summary paragraph would be prepared and placed into the appropriate section(s) of the FEIS. It was suggested that the paragraph and report clarify that there are other uncertainties associated with the ridership forecasts, besides those which have been focused on for this process. It was agreed that the write-up would include language to this effect.

- It was agreed that the group's effort should be termed an expert panel, as opposed to a Delphi method.

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