

Metro Vision Measure Documentation

DRAFT Data Dictionary - July 12, 2016

Contents

Measures Associated with “An Efficient and Predictable Development Pattern”	2
Housing and Employment in Urban Centers	2
Housing Density within the Urban Growth Boundary/Area (UGB/A).....	4
Measures Associated with “A Connected Multimodal Region”	5
Non-SOV (Single-Occupancy Vehicle) Mode Share to Work	5
Daily Vehicle Miles Traveled (VMT) Per Capita	6
Average Travel Time Variation (TTV)	6
Daily Person Delay Per Capita	7
Annual Traffic Fatalities	8
Measures Associated with “A Safe and Resilient Natural and Built Environment”	8
Surface Transportation Related Greenhouse Gas Emissions Per Capita	8
Protected Open Space	9
Housing and Employment in High Risk Areas.....	10
Measure Associated with “Healthy, Inclusive and Livable Communities”	12
Population Residing in Areas with Housing and Transportation Costs Affordable to the Typical Household in the Region	12
Measures Associated with “A Vibrant Regional Economy”	13
Regional Employment	13
Housing and Employment Near High Frequency Transit	14

Measures Associated with “An Efficient and Predictable Development Pattern”

There are two performance measures related to the outcomes and objectives associated with this overarching theme.

Housing and Employment in Urban Centers

Measure consists of two companion items: *housing* and *employment*.

Urban Center Housing

Description:	Share of the region’s total housing units located in urban centers
Lead/Lag:	Lead. A larger share of housing in urban centers will help contribute to changes in travel, such as increased use of travel modes other than single-occupancy vehicles and decreased per capita vehicle miles traveled, which may help decrease average transportation costs relative to household income.
Frequency:	Annual
Unit Type:	Percent of housing units
Polarity:	High values are good
Formula:	$\frac{\sum \text{housing units in urban centers}}{\sum \text{housing units in region}}$
Data Source #1:	DRCOG Master Housing Dataset (compiled from local parcel, land use, and building data; supplemented by proprietary data where necessary)
Data Quality: (Source #1)	Good. Compiles best information available from various sources. Not all housing units are recorded, especially in rural foothill and eastern plain areas due to a lack of data availability.
Data Source #2	DRCOG Urban Centers
Data Quality: (Source #2)	Excellent. Local jurisdictions identify urban centers and work with DRCOG to designate them through the process outlined in the <i>Metro Vision Growth and Development Supplement</i> .
Baseline:	10.0 percent (2014)
2040 Target:	25 percent

Target Rationale: Previous measures and targets aimed for 50 percent of new housing to be developed in urban centers. Applying that target to projected growth through 2040, on top of the existing share of housing in urban centers achieves close to 25 percent.

Directing housing growth to urban centers helps achieve various *Metro Vision* outcomes, as shown through previous scenario modeling exercises (e.g. reducing per capita vehicle miles traveled and greenhouse gas emissions).

Urban Center Employment

Description:	Share of the region's total employment located in urban centers
Lead/Lag:	Lead. A larger share of employment in urban centers will help contribute to changes in travel, such as increased use of travel modes other than single-occupancy vehicles and decreased per capita vehicle miles traveled, which may help decrease average transportation costs relative to household income.
Frequency:	Annual
Unit Type:	Percent of employment
Polarity:	High values are good
Formula:	$\frac{\sum \text{employment in urban centers}}{\sum \text{employment in region}}$
Data Source #1:	DRCOG Master Employment Level 2 Dataset (Quarterly Census of Employment and Wages; supplemented by proprietary data where necessary)
Data Quality: (Source #1)	Good. Compiles best information available from various sources. Does not include small firms whose precise location information is unavailable.
Data Source #2	DRCOG Urban Centers
Data Quality: (Source #2)	Excellent. Local jurisdictions identify urban centers and work with DRCOG to designate them through the process outlined in the <i>Metro Vision Growth and Development Supplement</i> .
Baseline:	36.3 percent (2014)
2040 Target:	50 percent

Target Rationale: Previous measures and targets aimed for 75 percent of new employment to be developed in urban centers. Applying that target to projected growth through 2040, on top of the existing share of employment in urban centers achieves close to 50 percent.

Directing employment growth to urban centers helps achieve various *Metro Vision* outcomes, as shown through previous scenario modeling exercises (e.g. reducing per capita vehicle miles traveled and greenhouse gas emissions).

Housing Density within the Urban Growth Boundary/Area (UGB/A)

Description: Gross density of housing units within the region's UGB/A, which is defined locally within the parameters set by DRCOG

Lead/Lag: Lead. Increased housing density will help contribute to changes in travel, such as increased use of travel modes other than single-occupancy vehicles and decreased per capita vehicle miles traveled, which may help decrease average transportation costs relative to household income. It may also help mitigate demand for converting unprotected open space to other uses, keeping it available for potential protection.

Frequency: Annual

Unit Type: Housing units per square mile (units/mi.²)

Polarity: High values are good

Formula:
$$\frac{\sum \text{housing units in UGB/A}}{\text{extent of UGB/A as allocated through Metro Vision}}$$

Data Source #1: DRCOG Master Housing Dataset (compiled from local parcel, land use, and building data; supplemented by proprietary data where necessary)

Data Quality: (Source #1) Good. Compiles best information available from various sources. Not all housing units are recorded, especially in rural foothill and eastern plain areas due to a lack of data availability.

Data Source #2 DRCOG UGB/A

Data Quality: (Source #2) Good. While the total amount of UGB/A available to communities and used in the denominator of the calculation is well-established by *Metro Vision*, the total area available spatially remains an underrepresentation, as communities maintain an unmapped surplus of UGB/A. Use of this spatial extent is only necessary to identify and sum the number of housing units in the numerator of the formula. Local changes may not be reflected in the DRCOG file, creating an undercount of housing units.

Baseline: 1,200 units/mi.² (2014)

2040 Target: 25 percent increase from 2014

Target Rationale: Based on a limited number of observations (2006-2014), while also holding the size of the UGB/A constant, housing density is on pace to increase well above the target previously established by *Metro Vision 2035*. Target seeks to improve upon trend through local and regional action toward *Metro Vision* outcomes and objectives.

Measures Associated with “A Connected Multimodal Region”

There are five performance measures related to the outcomes and objectives associated with this overarching theme.

Non-SOV (Single-Occupancy Vehicle) Mode Share to Work

Description: Share of workers using a travel mode other than driving alone to commute to work (or work from home)

Lead/Lag: Lead. Increased Non-SOV mode share to work will help contribute to changes in travel, such as decreased per capita vehicle miles traveled, which may help decrease average transportation costs relative to household income.

Frequency: Annual

Unit Type: Percent of workers 16 years and over

Polarity: High values are good

Formula:
$$\frac{\sum \text{workers 16 years and over} - \sum \text{workers 16 years and over who drove alone}}{\sum \text{workers 16 years and over}}$$

Data Source: US Census Bureau 5-Year American Community Survey (ACS) Table B08006 Sex of Workers by Means of Transportation to Work

Data Quality: Fair. To attempt to achieve lower margin of error, ACS relies on five years of sampling. Data released 12 months after period end.

Baseline: 25.1 percent (2014)

2040 Target: 35 percent

Target Rationale: Target continues a previously established target from *Metro Vision 2035* that was inverted to allow for language around the measure to be positive. Aiming to shift from SOV helps achieve various *Metro Vision* outcomes (e.g. reducing vehicle miles travel and helping mitigate congestion).

Daily Vehicle Miles Traveled (VMT) Per Capita

Description:	Average weekday vehicle miles of travel per capita
Lead/Lag:	Lead. Decreases in per capita VMT will help decrease per capita greenhouse gas emissions and mitigate projected increases in congestion and delay. Fewer vehicle miles may also reduce exposure to potential traffic crashes.
Frequency:	Annual
Unit Type:	Miles (mi.)
Polarity:	Low values are good
Formula:	$\frac{\text{total average weekday vehicle miles of travel}}{\text{population}}$
Data Source #1:	DRCOG Congestion Mitigation Program (CMP) Database
Data Quality: (Source #1)	Good. Database estimates travel volumes based on actual observations at year-round monitoring sites and temporary traffic count locations.
Data Source #2	DRCOG Population Forecast
Data Quality: (Source #2)	Good. Dataset is built around State Demography Office forecasts and local planning assumptions.
Baseline:	25.5 mi. (2010)
2040 Target:	10 percent decrease from 2010
Target Rationale:	Target continues a previously established target from <i>Metro Vision 2035</i> . Aiming to reduce VMT helps achieve various <i>Metro Vision</i> outcomes (e.g. helping mitigate congestion, greenhouse gas emissions, and other air pollution).

Average Travel Time Variation (TTV)

Description:	Average variation in travel time on roadway segments when comparing peak (i.e. rush hour) to off-peak conditions
Lead/Lag:	Lag. Reductions in per capita vehicle miles traveled will have a direct influence in mitigating the growth of this measure. However, one of the results of not mitigating growth in TTV might be limited ability to grow overall regional employment as it impacts quality of life and the reliability of the system for businesses to move goods.
Frequency:	Annual
Unit Type:	Ratio

Polarity:	Low values are good
Formula:	$\frac{\textit{congested travel time}}{\textit{free flow travel time}}$
Data Source:	DRCOG Congestion Mitigation Program (CMP) Database
Data Quality:	Good. Database estimates travel times based on actual observations at year-round monitoring sites and temporary traffic count locations.
Baseline:	1.22 (2014)
2040 Target:	Less than 1.30
Target Rationale:	Target aims to beat the 2040 forecast of 1.36 from the <i>2014 Annual Report on Roadway Traffic Congestion in the Denver Region</i> through local and regional action toward <i>Metro Vision</i> outcomes and objectives.

Daily Person Delay Per Capita

Description:	Average weekday person travel delay per capita (which accounts for the cumulative delay experienced across all vehicle occupants)
Lead/Lag:	Lag. Reductions in per capita vehicle miles traveled will have a direct influence in mitigating the growth of this measure. However, one of the results of not mitigating growth in delay might be limited ability to grow overall regional employment as it impacts quality of life and the cost for businesses to move goods.
Frequency:	Annual
Unit Type:	Minutes (min.)
Polarity:	Low values are good
Formula:	$\frac{\textit{total average weekday person hours of delay} \times 60 \frac{\textit{minutes}}{\textit{hour}}}{\textit{population}}$
Data Source #1:	DRCOG Congestion Mitigation Program (CMP) Database
Data Quality: (Source #1)	Good. Database estimates travel times based on actual observations at year-round monitoring sites and temporary traffic count locations.
Data Source #2	DRCOG Population Forecast
Data Quality: (Source #2)	Good. Dataset is built around State Demography Office forecasts and local planning assumptions.
Baseline:	6 min. (2014)

2040 Target: Less than 10 min.

Target Rationale: Target aims to beat the 2040 forecast of 10 minutes from the *2014 Annual Report on Roadway Traffic Congestion in the Denver Region* through local and regional action toward *Metro Vision* outcomes and objectives.

Annual Traffic Fatalities

Description: Annual total of traffic-related fatalities resulting from crashes occurring in the region

Lead/Lag: Lag. Decreases in per capita vehicle miles traveled may help reduce exposure to potential traffic crashes.

Frequency: Annual

Unit Type: Fatalities

Polarity: Low values are good

Formula: Not applicable

Data Source: Fatality Analysis Reporting System (FARS)

Data Quality: Good. Relies on statewide coordination of reporting by local law enforcement officers to the federal system.

Baseline: 185 fatalities (2014)

2040 Target: Less than 100 fatalities

Target Rationale: Target aims to continue downward trend through improvements in vehicle technology, emergency response, and other safety improvements.

Measures Associated with “A Safe and Resilient Natural and Built Environment”

There are three performance measures related to the outcomes and objectives associated with this overarching theme.

Surface Transportation Related Greenhouse Gas Emissions Per Capita

Description: Surface transportation related emissions of greenhouse gases (i.e. carbon dioxide, methane, and nitrous oxide)

Lead/Lag: Lag. Decreases in surface transportation related emissions would be connected to decreases in per capita vehicle miles traveled, or use of travel modes other than single-occupancy vehicle, which are, in turn, connected to measures of development patterns.

Frequency:	Irregular. Model is periodically run for air quality conformity analysis. However, results are only available for five-year intervals.
Unit Type:	Pounds of carbon dioxide equivalent (lbs. CO ₂ e)
Polarity:	Low values are good
Formula:	$\frac{\text{total surface transportation related greenhouse gas emissions}}{\text{population}}$
Data Source #1:	Motor Vehicle Emissions Simulator (MOVES) as run by the Colorado Department of Public Health and Environment (CDPHE) using results from the DRCOG Focus Travel Model
Data Quality: (Source #1)	Fair. Relies on model results, not actual observations.
Data Source #2	DRCOG Population Forecast
Data Quality: (Source #2)	Good. Dataset is built around State Demography Office forecasts and local planning assumptions.
Baseline:	26.8 lbs. CO ₂ e (2010)
2040 Target:	60 percent decrease from 2010
Target Rationale:	Target continues a previously established target from <i>Metro Vision 2035</i> . It accounts for a projected reduction in fuel burned because of more efficient engines and an increase in the number of alternative fuel motor vehicles (e.g. electricity and natural gas), and aspires for changes from local and regional action toward <i>Metro Vision</i> outcomes and objectives.

Protected Open Space

Description:	Land protected from development for outdoor recreation; wildlife habitat; natural resources; prominent geographical, geologic, or cultural features; ranching; farming; visual buffering; and/or community separation
Lead/Lag:	Lag. A larger pool of unprotected open space may remain available for potential protection as housing density increases.
Frequency:	Annual
Unit Type:	Square miles (mi. ²)
Polarity:	High values are good

Formula:
$$\begin{aligned} & \sum \text{area included in DRCOG Open Space Inventory} \\ & \quad - \sum \text{area described as PROPOSED, FUTURE, or OPTION} \\ & \quad - \sum \text{area typed SCHOOL or SPECIAL USE} \end{aligned}$$

Data Source: DRCOG Open Space Inventory

Data Quality: Good. Dataset relies on the annual aggregation and classification standardization of locally updated and maintained open space data.

Baseline: 1,841 mi.² (2014)

2040 Target: 2,100 mi.²

Target Rationale: Target aspires to continue the increase in protected open space while recognizing that the limited extent of the region of 5,288 mi.² may eventually limit the pace of this increase.

Housing and Employment in High Risk Areas

Measure consists of two companion items: **housing** and **employment**.

Housing in High Risk Areas

Description: Share of the region's housing in areas with wildfire Fire Threat Index (FTI) values of 4 or 5 ("high threat" and "highest threat") and/or Special Flood Hazard Areas (SFHA), which are areas with a 1 percent chance of inundation per year (often referred to as the "100-year floodplain")

Lead/Lag: Lag. A decreasing share is likely to lag behind other related measures. For example, protection of additional open space in or near high-risk areas may help move this share in the intended direction.

Frequency: Annual

Unit Type: Percent of housing units

Polarity: Low values are good

Formula:
$$\frac{\sum \text{housing units in high risk areas}}{\sum \text{housing units in region}}$$

Data Source #1: DRCOG Master Housing Dataset (compiled from local parcel, land use, and building data; supplemented by proprietary data where necessary)

Data Quality: (Source #1) Good. Compiles best information available from various sources. Not all housing units are recorded, especially in rural foothill and eastern plain areas due to a lack of data availability.

Data Source #2	Federal Emergency Management Agency (FEMA) National Flood Hazard Layer (NFHL)
Data Quality: (Source #2)	Good. Maps are maintained as a part of the National Flood Insurance Program (NFIP), but will not reflect property-by-property determinations of map amendments (map revisions based on physical modification of the floodplain are represented in the NFHL).
Data Source #3	Colorado State Forest Service <i>Colorado Wildfire Risk Assessment Project (2013)</i>
Data Quality: (Source #3)	Good. The project derived the threat values by combining landscape characteristics including surface fuels and canopy fuels, resultant fire behavior, historical fire occurrence, percentile weather derived from historical weather observations, and terrain conditions, combined using analysis techniques based on established fire science. However, the resultant data is available at 30-meter resolution, and reflects characteristics from 2012 or earlier.
Baseline:	1.2 percent (2014)
2040 Target:	Less than 1 percent
Target Rationale:	A portion of the region’s residents may remain in high-risk areas, and may even mitigate that risk through investments that do not show up in the regional datasets used above. However, target can be achieved by encouraging growth to occur on land outside these high-risk areas.

Employment in High Risk Areas

Description:	Share of the region’s employment in areas with wildfire Fire Threat Index (FTI) values of 4 or 5 (“high threat” and “highest threat”) and/or Special Flood Hazard Areas (SFHA), which are areas with a 1 percent chance of inundation per year (often referred to as the “100-year floodplain”)
Lead/Lag:	Lag. A decreasing share is likely to lag behind other related measures. For example, protection of additional open space in or near high-risk areas may help move this share in the intended direction.
Frequency:	Annual
Unit Type:	Percent of employment
Polarity:	Low values are good
Formula:	$\frac{\sum \text{employment in high risk areas}}{\sum \text{employment in region}}$
Data Source #1:	DRCOG Master Employment Level 2 Dataset (Quarterly Census of Employment and Wages; supplemented by proprietary data where necessary)

Data Quality: (Source #1)	Good. Compiles best information available from various sources. Does not include small firms whose precise location information is unavailable.
Data Source #2	Federal Emergency Management Agency (FEMA) National Flood Hazard Layer (NFHL)
Data Quality: (Source #2)	Good. Maps are maintained as a part of the National Flood Insurance Program (NFIP), but will not reflect property-by-property determinations of map amendments (map revisions based on physical modification of the floodplain are represented in the NFHL).
Data Source #3	Colorado State Forest Service <i>Colorado Wildfire Risk Assessment Project</i> (2013)
Data Quality: (Source #3)	Good. The project derived the threat values by combining landscape characteristics including surface fuels and canopy fuels, resultant fire behavior, historical fire occurrence, percentile weather derived from historical weather observations, and terrain conditions, combined using analysis techniques based on established fire science. However, the resultant data is available at 30-meter resolution, and reflects characteristics from 2012 or earlier.
Baseline:	2.9 percent (2014)
2040 Target:	Less than 2.5 percent
Target Rationale:	Certain types of jobs may still need to remain in high-risk areas. However, target can be achieved by encouraging growth to occur on land outside these high-risk areas.

Measure Associated with “Healthy, Inclusive and Livable Communities”

There is one performance measure related to the outcomes and objectives associated with this overarching theme.

Population Residing in Areas with Housing and Transportation Costs Affordable to the Typical Household in the Region

Description:	Share of the region’s population living in areas with housing and transportation costs that do not exceed 45 percent of the annual income of the typical household in the region, where the typical household earns the median income for the region, with both the average household size and average number of commuters per household for the region
Lead/Lag:	Lag. Improvements in this measure rely on changes in development patters (e.g. increased housing density, as well as growth in urban centers and/or near high frequency transit) and changes in travel (e.g. increasing non-single occupancy vehicle mode share to work).
Frequency:	Irregular. The Center for Neighborhood Technology (CNT) plans to update the index every two years, depending on funding.

Unit Type:	Percent of population
Polarity:	High values are good
Formula:	$\frac{\sum \text{population in block groups in areas with affordable H+T}}{\sum \text{population in block groups with H+T calculated}}$
Data Source:	CNT Housing and Transportation (H+T [®]) Affordability Index using data from the US Census Bureau's American Community Survey (ACS), Longitudinal Employer-Household Dynamics (LODES), TIGER (Topologically Integrated Geographic Encoding and Referencing) Line Files, and the General Transit Feed Specification (GTFS)
Data Quality:	Fair. Housing costs reflect aggregated answers from the ACS. Transportation costs must be modeled based on neighborhood and household characteristics, and do not reflect direct observation. The transportation cost model is proprietary and subject to ongoing improvements; longitudinal comparison of results may be limited.
Baseline:	41 percent (2013)
2040 Target:	50 percent
Target Rationale:	Target can be reached with progress toward 1) providing more opportunities for people to live in areas with affordable H+T, and 2) expanding the extent of areas with affordable H+T, both through local and regional action toward <i>Metro Vision</i> outcomes and objectives.

Measures Associated with “A Vibrant Regional Economy”

There are two performance measures related to the outcomes and objectives associated with this overarching theme.

Regional Employment

Description:	The total number of jobs in the region
Lead/Lag:	Lag. Growth in employment relies on the ability of the region to attract, retain, and grow businesses, which is partially related to other measures, such as travel time variation, delay, and housing and transportation costs.
Frequency:	Annual
Unit Type:	Jobs
Polarity:	High values are good

Formula:	$\sum \text{Employment in DOLA Region 3 from Data Source \#1}$ $+ \sum \text{Employment in DRCOG portion of Weld County from Data Source \#2}$
Data Source #1:	Colorado Department of Local Affairs (DOLA), State Demography Office
Data Quality: (Source #1)	Good. The State Demography Office combines various sources of employment data, including the US Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages (QCEW) and the US Census Bureau Nonemployer Statistics. Source does not aggregate the data to allow for a separate accounting of the portion of southwest Weld County in the region.
Data Source #2:	DRCOG Master Employment Level 3 Dataset (Quarterly Census of Employment and Wages; supplemented by proprietary data where necessary)
Data Quality: (Source #2)	Good. Compiles best information available from various sources. Includes small firms whose precise location information is unavailable. This allows for comparison to county-level sources that include these firms (i.e. DOLA).
Baseline:	1.8 million jobs (2014)
2040 Target:	2.6 million jobs
Target Rationale:	Target corresponds with the forecast by the State Demography Office, and is the basis of assumptions in various regional plans.

Housing and Employment Near High Frequency Transit

Measure consists of two companion items: ***housing*** and ***employment***.

Housing Near High Frequency Transit

Description:	Share of the region's housing within ½ mile of rapid transit stations, or within ¼ mile of bus stops with 96 or more departures per weekday (average of 4 per hour)
Lead/Lag:	Lead. A larger share of housing in urban centers will help contribute to changes in travel, such as increased use of travel modes other than single-occupancy vehicles and decreased per capita vehicle miles traveled, which may help decrease average transportation costs relative to household income.
Frequency:	Annual
Unit Type:	Percent of housing units
Polarity:	High values are good
Formula:	$\frac{\sum \text{housing units near high frequency transit}}{\sum \text{housing units in region}}$

Data Source #1:	DRCOG Master Housing Dataset (compiled from local parcel, land use, and building data; supplemented by proprietary data where necessary)
Data Quality: (Source #1)	Good. Compiles best information available from various sources. Not all housing units are recorded, especially in rural foothill and eastern plain areas due to a lack of data availability.
Data Source #2	Regional Transportation District (RTD) General Transit Feed Specification (GTFS) reflecting the fourth and final service change of the calendar year
Data Quality: (Source #2)	Excellent. Data represents schedule as maintained by RTD within an industry standard format.
Baseline:	29.7 percent (2014)
2040 Target:	35 percent
Target Rationale:	Target recognizes that the reach of high frequency transit is already set to increase through projects that have opened since the baseline number, or are under construction, and aspires to account for further system improvements and development near high frequency transit.

Employment Near High Frequency Transit

Description:	Share of the region's employment within ½ mile of rapid transit stations, or within ¼ mile of bus stops with 96 or more departures per weekday (average of 4 per hour)
Lead/Lag:	Lead. A larger share of employment in urban centers will help contribute to changes in travel, such as increased use of travel modes other than single-occupancy vehicles and decreased per capita vehicle miles traveled, which may help decrease average transportation costs relative to household income.
Frequency:	Annual
Unit Type:	Percent of employment
Polarity:	High values are good
Formula:	$\frac{\sum \text{employment near high frequency transit}}{\sum \text{employment in region}}$
Data Source #1:	DRCOG Master Employment Level 2 Dataset (Quarterly Census of Employment and Wages; supplemented by proprietary data where necessary)
Data Quality: (Source #1)	Good. Compiles best information available from various sources. Does not include small firms whose precise location information is unavailable.
Data Source #2	Regional Transportation District (RTD) General Transit Feed Specification (GTFS) reflecting the fourth and final service change of the calendar year

Data Quality: (Source #2) Excellent. Data represents schedule as maintained by RTD within an industry standard format.

Baseline: 48.4 percent (2014)

2040 Target: 60 percent

Target Rationale: Target recognizes that the reach of high frequency transit is already set to increase through projects that have opened since the baseline number, or are under construction, and aspires to account for further system improvements and development near high frequency transit.