LINK21

CONNECT NORTHERN CALIFORNIA

MODEL DOCUMENTATION: REFINED LAND USE MODEL SUMMARY

DRAFT

March 2024

Prepared By:
Link21 Travel Demand and Land Use Consultant Team

DRAFT

BART

CAPITOL CORRIDOR

INTENTIONALLY LEFT BLANK

Table of Contents

INTENTIONALLY LEFT BLANK

Acronyms and Abbreviations

ACRONYM/ABBREVIATION	DEFINITION
BART	San Francisco Bay Area Rapid Transit
LUM	Land Use Model
MTC	Metropolitan Transportation Commission
PBA2050	Plan Bay Area 2050
REMI	Regional Economic Models, Inc
TDLU	Travel Demand and Land Use

Link21 Program Team Names

TEAM NAME	TEAM MEMBERS
Program Management Consultants (PMC)	The HNTB Team
Program Management Team (PMT)	BART/CCJPA + PMC
Consultants	Consultants supporting program identification/project selection
Link21 Team	PMT + Consultants
TDLU Team	Travel Demand and Land Use Consultant Team

INTENTIONALLY LEFT BLANK

1. Executive Summary

1.1. Goals of the Link21 Land Use Model

The Link21 Travel Demand and Land Use (TDLU) Modeling System includes three major components: 1) Regional Economic Forecast, 2) Land Use Allocation Model, and 3) Transportation Model. Each of the three interrelated model components will produce forecasts and business case metrics for the entire nine-county San Francisco Bay Area Region and its individual counties. The regional economic forecast and land use allocation model are collectively referred to as the Link21 Refined Land Use Model (LUM). The Refined Land Use Model Documentation describes the modeling process and validation methodology for the regional economic forecast and land use allocation models. The full Refined Land Use Model Documentation report is available upon request.

The central objectives of the regional economic forecast and land use allocation models are to provide an understanding of the impacts of the Link21 transportation investment scenarios on the economic growth of each of the nine counties and on the land use changes anticipated at or near transit stations. The land use allocation model is also able to provide inputs for the travel model, which assesses the performance of the regional transportation system. With analyses in the TDLU Modeling System, the team can compare the performance of each investment scenario to the no-action base case and the cost-versus-benefit performance of different Link21 scenarios.

1.2. Land Use Model Overview

Regional Economic Forecast

A regional economic forecast provides a long-range view of economic and demographic changes in a region. The regional economic forecast that serves as the No-Action Baseline for evaluation of Link21 concept alternatives utilizes the REMI PI+ model, the same model used by the Metropolitan Transportation Commission (MTC). The assumptions and processes used to generate the No-Action Baseline closely align with MTC's processes and the resulting preferred forecast published in MTC's *Plan Bay Area 2050 (PBA 2050)*.

Land Use Allocation Model

The land use allocation model takes horizon-year (2050) accessibility metrics from the travel demand model, estimates real estate demand and supply, considers zoning-related limitations on development, and assigns households and jobs to horizon-year units and job spaces in existing land uses and feasible development options. The forecasted households and jobs that are suballocated by the land use allocation model

are generated by the regional economic forecasting model to closely match forecasts from Plan Bay Area 2050. While the forecasted household and job totals can be held constant across model runs, Link21 investments are expected to produce changes to accessibility and local land use policies that flow through the land use allocation model to generate a different distribution of households and jobs with each Link21 investment scenario. The land use allocation model is composed of the following steps:

- Step 1: Accessibility metrics are produced for each transportation investment scenario from outputs of the calibrated and validated travel demand model.
- Step 2: Land use demand model simulates prices and rents for various land uses based on the accessibility metrics.
- Step 3: Land use supply model estimates market-feasible development options based on changes in prices and rents, as well as constraints imposed by proposed land use policies.
- Step 4: Household and job assignment model assigns sub-regional households and jobs control totals to existing land uses and new feasible buildings.

1.3. Calibration and Validation

To ensure reasonableness of the model components and results, each LUM step was calibrated and validated individually, then the model components were combined to determine if the model performed reasonably. The regional model was calibrated to closely match MTC's PBA2050 forecast. The land use allocation model was validated through stress and sensitivity testing to evaluate its performance with diverse inputs reflecting varied conditions. An external panel of experts was convened to review the model's assumptions and performance and provide guidance during its development.

1.4. Land Use Metrics produced by the LUM

The Link21 LUM's outputs were designed by the Link21 Business Case team to help stakeholders understand how various strategic transportation investment options and their corresponding land use policies might inform economic growth, shape land use, and address displacement concerns across the Bay Area.

The outputs of the LUM include groups of indicators related to potential future land uses and residential displacement risk. The land-use related metrics produced by the LUM are:

Measures of Potential Future Land use

- Change in net new market-feasible non-residential square feet
- Change in net new market-feasible residential units
- Change in net new inclusionary units

- Each of these measures calculated per acre of land that is market-feasible for redevelopment

Measures of Displacement Risk

- Change in average market rents per square foot
- Change in average market purchase prices per unit
- Change in the number of existing units on parcels where redevelopment or demolition is market feasible
- Change in households for four income groups

In addition to producing land use-related business case metrics, the land use allocation model produces outputs that could be used as inputs into the transportation model.